# County of Los Angeles

# Parcel 44 Project, Marina del Rey
## Draft Environmental Impact Report
Project # R2013-01647-(4)
SCH #2013081040

Volume II
Appendix 1.0 through 4.7

Prepared For:

County of Los Angeles
Department of Regional Planning
320 Temple Street
Los Angeles, CA 90012

February 2015

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**Prepared for:**

County of Los Angeles
Department of Regional Planning
320 Temple Street
Los Angeles, CA 90012

**Prepared by:**

Impact Sciences, Inc.
803 Camarillo Springs Road, Suite A
Camarillo, California 93012

**February 2015**

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*County of Los Angeles*

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Volume III

Appendix 4.8 through 4.10.3

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County of Los Angeles
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320 Temple Street
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# APPENDIX 1.0

## Notice or Preparation (NOP), Initial Study, and Comments

# Notice of Preparation

Richard J. Bruckner
Director

# NOTICE OF PREPARATION
# AND
# NOTICE OF SCOPING MEETING

**DATE:** August 15, 2013

**PROJECT TITLE:** Parcel 44 – Project Number R2013-01647
Environmental Review No. 201300142

**PROJECT LOCATION:** Parcel 44 is bordered to the north by Bali Way, the east by Admiralty Way and the south by Mindanao Way. The U-shaped site wraps partially around Basin G of the Marina del Rey small-craft harbor. The parcel consists of 8.39 landside acres and 7.18 waterside or submerged acres (15.37 acres total).

**PROJECT APPLICANT:** Pacific Marina Venture, LLC
13737 Fiji Way, C-10
Marina del Rey, CA 90292

**CEQA LEAD AGENCY:** County of Los Angeles
Department of Regional Planning
320 West Temple Street, Room 1362
Los Angeles, CA 90012

The County of Los Angeles is the lead agency and will prepare an Environmental Impact Report (EIR) for the Project identified below. In compliance with Section 15082 of the California Environmental Quality Act (CEQA) Guidelines, the County of Los Angeles is sending this Notice of Preparation (NOP) to each responsible agency, interested parties and federal agencies involved in approving the Project and to trustee agencies responsible for natural resources affected by the Project. Within 30 days after receiving the Notice of Preparation, each agency shall provide the County of Los Angeles with specific details about the scope and content of the environmental information related to that agency's area of statutory responsibility.

The purpose of this NOP is to solicit the views of your agency as to the scope and content of the environmental information germane to your agency's statutory authority with respect to the Project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the Project.

## PROJECT LOCATION AND ENVIRONMENTAL SETTING

Parcel 44 is a U-shaped site that wraps partially around Basin G of the Marina del Rey small-craft harbor. The parcel consists of a total of 8.39 landside acres and 7.18 waterside (or submerged) acres. There are seven existing structures on the site totaling 14,724 square feet. The existing landside structures were developed as office space for boat brokers, a boat repair shop, and a yacht club currently. The site provides a boaters' bathroom facility.

## PROJECT SUMMARY

The proposed project consists of the demolition of all existing landside structures on Parcel 44 and redevelopment of the landside parcel. (The project does not include redevelopment of the Parcel 44 anchorage that is located on the waterside portion of the subject parcel. Development approval for demolition of the existing Parcel 44 anchorage and the subsequent construction of a new private boat anchorage on the waterside portion of the subject parcel has already been granted by the California Coastal Commission pursuant to Coastal Development Permit (CDP) No. 5-11-131; final issuance of this CDP was given by the Coastal Commission staff on June 26, 2012.

The following is a description of the proposed new structures on Parcel 44, which total approximately 83,778 square feet of building area. Building I (as denoted on the site plan) will serve as boaters' bathrooms with an area of 386 square feet. Building II will serve a Trader Joe's (or similar) grocery market of 13,625 square feet. Building III (386 square feet) is similar to Building I and will serve as boaters' bathrooms. Building IV is a two-story structure. The ground floor of this building will be occupied entirely by a West Marine (or similar) retail store (25,000 square feet). The second floor of this building will contain marine administrative offices (6,901 square feet), boat brokers' offices (5,133 square feet), boaters' bathroom and laundry (542 square feet), additional offices to replace existing office space to be demolished (4,554 square feet) and a community room/boaters' lounge (840 square feet). Building V will accommodate retail space (4,260 square feet) and a restaurant (2,367 square feet). Building VI will contain a two-story, waterfront-oriented restaurant (8,278 square feet) with a prominent "tower" feature to serve as an entry foyer to the restaurant, which will be accessible from Admiralty Way and Bali Way. The first floor of this building will also accommodate commercial retail space (9,270 square feet). Building VII will serve as boaters' bathrooms with an area of 386 square feet. Building VIII will accommodate a yacht club (1,150 square feet) and a boat repair shop (700 square feet).

In addition, an open-air boat stacking/rack system is included, allowing outdoor storage of up to 44 boats (stacked 3-boats-high), as are 13 "mast-up"/small sail boat storage spaces (adjacent to the proposed yacht club/boat repair shop structure). The project proposes 479 on-grade parking spaces on the subject parcel, of which 284 are standard-dimensioned spaces, 11 are accessible spaces and 184 are compact parking spaces. Seventy (70) of the parking spaces are in a tandem configuration. The project also proposes 74 bicycle parking spaces. With the 25 maximum vehicle parking reduction allowed under County Code for the bicycle parking spaces being provided on-site (County Code allows a reduction of one parking space for every two bicycle parking spaces provided above the required number, not to exceed five percent of the total number of spaces otherwise required), the project's proposed uses require 485 spaces per Code. (The Applicant will be filing for a Parking Permit to authorize a modest parking reduction for the project, in order to provide some flexibility regarding parking configuration and numbers to account for site installation of infrastructure improvements, i.e., transformers, etc., during construction, and to allow for commercial tandem parking.) The project also includes development of a waterfront pedestrian promenade along the parcel's bulkhead and realignment of the Marvin Braude Bike Path adjacent to the Admiralty Way-fronting waterfront pedestrian promenade; an interactive water feature is planned for the courtyard space fronting the promenade at project's main entrance on Admiralty Way.

## ENTITLEMENT REQUIREMENTS AND DISCRETIONARY APPROVALS

Discretionary approvals required for implementation of the proposed project may include, but are not limited to, the following:

- Certification of an Environmental Impact Report
- Approval of a Coastal Development Permit
- Approval of a Conditional Use Permit
- Approval of a Variance
- Approval of a Parking Permit

**POTENTIAL PROJECT IMPACTS:** Because of the requested entitlement requirements identified above, and based on the Initial Study determination, an Environmental Impact Report (EIR) is necessary for the proposed project. Based on a preliminary assessment of potential environmental impacts that may occur as a result of the proposed project (see attached initial study), the areas of potential environmental impact to be addressed in the Project EIR will include at least the following:

**Potential Hazards**
- Geology
- Flood
- Noise

**Potential Impacts to Resources**
- Water Quality
- Air Quality
- Greenhouse Gas Emissions
- Biota
- Visual Qualities

**Potential Impacts to Services**
- Traffic/Access
- Sewage Disposal
- Fire/Sheriff Services
- Utilities/Other Services

**Potential Other Impacts**
- General (change in pattern, scale, or character, light and glare)

To provide a complete record of the County's environmental decision making, environmental issues that do not rise to the level of significant impacts will be addressed in the EIR in a separate section entitled "Impacts Found to Be Less Than Significant."

**NOTICE OF PREPARATION REVIEW AND COMMENTS**

The review period for the NOP will be from August 19, 2013 to September 19, 2013.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than **September 19, 2013**. Please direct all written comments to the following address. In your written response, please include the name of a contact person in your agency.

Anita Gutierrez, AICP
County of Los Angeles
Department of Regional Planning
320 Temple Street
Los Angeles, California 90012
Telephone: (213) 974-4813
Fax (213) 626-0434
Email: marinaplanner@planning.lacounty.gov

## SCOPING MEETING

To assist in local participation, a Scoping Meeting will be held to present the proposed project and to solicit suggestions from the public and responsible agencies on the content of the Draft EIR. The Scoping Meeting will be held at Burton Chase Park, Community Room, located at 13650 Mindanao Way, Marina del Rey, CA 90292 on September 10, 2013 from 6pm to 8pm.

## REVIEW MATERIALS

The County of Los Angeles Department of Regional Planning is soliciting input based on your views and opinions concerning the scope of the EIR for the proposed project. To facilitate your review, the following materials are attached:

- Los Angeles County Initial Study
- 500-foot Radius Land Use Map
- Site Plan

Additional copies of the notice of Preparation are available for public review on the Department of Regional Planning website: http://planning.lacounty.gov/ as well as at the following libraries:

Lloyd Taber-Marina del Rey Library
4533 Admiralty Way
Marina del Rey, CA 90292

Culver City Julian Dixon Library
4975 Overland Avenue
Culver City, CA 90230

Abbot Kinney Memorial Library
501 S. Venice Boulevard
Venice, CA 90291

# Environmental Checklist Form (Initial Study)

**County of Los Angeles, Department of Regional Planning**

**Project title:** Parcel 44 Development/ Project No. R2013-01647/ Case No(s). ENV201300142

**Lead agency name/address:** Los Angeles County, 320 West Temple Street, Los Angeles, CA 91020

**Contact Person and phone number:** Anita Gutierrez, Special Projects Section, (213) 974-4813

**Project sponsor's name/address:** Pacific Marina Venture c/o Pacific Ocean Management, LLC.
13737 Fiji Way, C10 Marina del Rey, California 90292

**Project location:** Lease Parcel 44, Marina del Rey, California 90292
*APN*: 4224 008 901 *Thomas Guide*: Page 672 B-7 *USGS Quad*: Venice (T2S, R15W)

**Gross Acreage:** 17.41 acres (Total), 8.39 acres (Landside), 7.18 acres (Water)

**General plan designation:** Marina del Rey Specific Plan

**Community/Area wide Plan designation:** Marina del Rey Specific Plan

**Zoning:** Marina del Rey Specific Plan: "Bali Area," Boat Storage (portion of parcel at corner of Admiralty Way and Mindinao Way), Marine Commercial (portion adjacent to Admiralty Way), Visitor-Serving/Convenience Commercial (on mole road portions) and Water with a Waterfront Overlay.

**Description of project:**

Parcel 44 is a U-shaped site that wraps partially around Basin G of the Marina del Rey small-craft harbor. The parcel consists of a total of 8.39 landside acres and 7.18 waterside (or submerged) acres. There are seven existing structures on the site totaling 14,724 square feet and a paved surface parking lot with 110 boat parking spaces and 383 vehicle parking spaces. The existing landside structures are developed as office space for boat brokers, a boat repair shop, and a yacht club currently. The site provides only a single boaters' bathroom facility.

The proposed project consists of the demolition of all existing landside structures on Parcel 44 and redevelopment of the landside parcel. (The redevelopment of the Parcel 44 anchorage that is located on the waterside portion of the subject parcel is not a part of this project. Development approval for demolition of the existing Parcel 44 anchorage and the subsequent construction of a new private boat anchorage on the waterside portion of the subject parcel has already been granted by the California Coastal Commission pursuant to Coastal Development Permit (CDP) No. 5-11-131; final issuance of this CDP was given by the Coastal Commission staff on June 26, 2012.)

The following is a description of the proposed new structures on Parcel 44, which total approximately 83,778 square feet of building area.

- Building I (as denoted on the site plan) will serve as boaters' bathrooms with an area of 386 square feet.
- Building II will serve a "Trader Joe's" (or similar) grocery market of 13,625 square feet.
- Building III (386 square feet) is similar to Building I and will serve as boaters' bathrooms.
- Building IV is a two-story structure. The ground floor of this building will be occupied entirely by a "West Marine" (or similar) retail store (25,000 square feet). The second floor will contain offices for boat brokers (5,133 square feet), offices to replace existing offices located on the parcel (4,554 square feet), marine administrative offices (6,901 square feet), a community room/lounge (840 square feet) and a boater's laundry room (542 square feet).
- Building V will accommodate retail space (4,260 square feet) and a restaurant (2,367 square feet).
- Building VI will contain a two-story, waterfront-oriented restaurant (8,278 square feet) with a prominent "tower" feature to serve as an entry foyer to the restaurant, which will be accessible from Admiralty Way and Bali Way. The first floor of this building will also accommodate commercial retail space (9,270 square feet).
- Building VII will serve as boaters' bathrooms with an area of 386 square feet.
- Building VIII will accommodate the yacht club (1,150 square feet) and a boat repair shop (700 square feet).

In addition, an open-air boat stacking/rack system will be included on the northwest portion of the project site along Bali Way, allowing outdoor storage of up to 44 boats (stacked three-boats-high), along with 13 "mast-up"/small sailboat storage spaces adjacent to the yacht club/boat repair building.

The project proposes 479 on-grade parking spaces on the subject parcel, of which 284 are standard-dimensioned spaces, 11 are accessible spaces and 184 are compact parking spaces. 70 of the parking spaces are in a tandem configuration. The project also proposes 74 bicycle parking spaces. County Code allows a maximum reduction of 25 vehicle parking spaces for this project, given the number of bicycle parking spaces being provided on-site. With the parking reduction, the project's proposed uses require 485 spaces per Code. (Note the Applicant will be filing for a Parking Permit to allow a modest parking reduction for the project and to allow tandem parking, in order to provide some flexibility regarding parking configuration and numbers to account for installation of site infrastructure improvements--i.e., transformers, etc.--during construction.) The project also includes development of a waterfront pedestrian promenade along the parcel's bulkhead and realignment of the Marvin Braude Bike Path to run parallel to the waterfront pedestrian promenade.

**Surrounding land uses and setting:** The Marina del Rey Hotel is located to the west on the south side and terminous of Bali Way and a vacant office building as well as Burton Chase Park are located to the southwest on Mindanao Way. Office and retail commercial uses are located to the east and southeast on the east side of Admiralty Way. A public parking lot and boat storage lot (to be developed into an expansion of Burton Chase Park) are located directly south of the project on the south side of Mindanao Way. Parcel 44 surrounds Marina Basin "G," an existing boat anchorage.

**Other public agencies whose approval may be required (e.g., permits, financing approval, or participation agreement):**

| *Public Agency* | *Approval Required* |
|---|---|
| • *California Coastal Commission* | • *Coastal Commission review would only be required in the event the County's Coastal Development Permit approval for the project is appealed to the Coastal Commission; the Coastal Commission otherwise retains no permitting authority over the project.* |
| • *LACO Board of Supervisors* | • *For parcel lease extension documentation approval.* |
| • *LACO Div. of Building &Safety* | • *For Building Permit and related approvals.* |

**Major projects in the area:**

| *Project/Case No.* | *Description and Status* |
|---|---|
| *CDP No.: 5-11-131* | *Parcels 10, 21, 42/43, 44, 47, 48, 49R, 53, 77, 125, EE and BW/9U: California Coastal Commission-approved Coastal Development Permit for "master" waterside anchorage redevelopment authorizing demolition of existing anchorages and construction of new anchorages and facilities appurtenant thereto on the waterside portions of the above-referenced Marina parcels.* |
| *R2010-00669/ RENV201000022* | *Parcels 42 and 43(APN No. 4224-008-900): Site Plan Review for rehabilitation of the Marina del Rey Hotel, an existing 154-room hotel, and the demolition and subsequent redevelopment of the hotel's private boat anchorage.* |
| *R2006-03647/ CDP200600008* | *Parcel 10R (APN No. 4224-003-900): Approved Coastal Development Permit to authorize the demolition of an existing 136-unit apartment complex and the development of a 400-unit complex.* |
| *R2006-03652/ CDP200600009* | *Parcel 14 (APN No. 4224-003-900): Approved Coastal Development Permit to authorize the demolition of an existing parking lot and the development of a 126-unit apartment complex.* |
| *CDP200600007* | *Parcel 9U, Northern Portion (APN No. 4224-002-900): Pending Coastal Development Permit to authorize the construction of a 288-room hotel with a restaurant and other auxiliary facilities.* |
| *R2006-03643/ CDP200600006* | *Parcel 9U, Southern Portion (APN No. 4224-002-900): Coastal Development Permit to authorize the development of a public wetland and upland park.* |

| | |
|---|---|
| *R2007-01480/ CDP200700001* | *Parcels 55, 56 &W (APN No. 4224-011-901): Pending Coastal Development Permit to authorize the demolition of Fisherman's Village and all existing parking, landscaping, and hardscaping, and the development of a new mixed-use commercial plaza and multi-story parking structure.* |
| *R2006-01510/ CDP200600002 & CDP 20060003* | *Parcels 147 &21 (APN No. 4224-006-900): Coastal Development Permit to authorize the demolition of all existing landside improvements and the construction of a 114 unit senior accommodations facility, 5000 square feet of retail space and other site amenities and facilities; &447-space parking structure, marine commercial &community park (Parcel 21)* |
| *R2009-00924* | *Parcel 145R (APN No. 4224-006-900): (Interior and exterior renovation of the existing 132-room Marina International Hotel (Under Construction)* |
| *R2009-00752 PP201000954* | *Parcel 64 (APN No. 4224-011-901): Interior and exterior renovation of the existing 224-unit Villa Venetia apartment complex (Under Construction)* |
| *R2008-02340/ CDP200800007* | *Parcels 52R (APN No. 4224-003-900): Coastal Development Permit authorizing a dry stack boat storage facility, with capacity for 345 boats, along with appurtenant office space and customer lounge, 30 mast up storage spaces, parking, and a new Sheriff's Department/Lifeguard Boatwright facility.* |

**Reviewing Agencies:** [*See CEQA Appendix B to help determine which agencies should review your project*]

*Responsible Agencies*

- ☒ None
- Regional Water Quality Control Board:
  - ☐ Los Angeles Region
  - ☐ Lahontan Region
- ☐ Coastal Commission
- ☐ Army Corps of Engineers
- ☐ City of Culver
- ☐ Los Angeles City Bureau of Sanitation

*Special Reviewing Agencies*

- ☐ None
- ☒ Coastal Commission
- ☐ Santa Monica Mountains Conservancy
- ☐ National Parks
- ☐ National Forest
- ☐ Edwards Air Force Base
- ☐ Resource Conservation District of Santa Monica Mountains Area
- ☒ Local Native American Tribe

*Regional Significance*

- ☒ None
- ☐ SCAG Criteria
- ☐ Air Quality
- ☐ Water Resources
- ☐ Santa Monica Mtns. Area

*Trustee Agencies*

- ☒ None
- ☐ State Dept. of Fish and Game
- ☐ State Dept. of Parks and Recreation
- ☐ State Lands Commission
- ☐ University of California (Natural Land and Water Reserves System)

*County Reviewing Agencies*

- ☒ DPW:
  - Land Development Division (Grading & Drainage)
  - Geotechnical & Materials Engineering Division
  - Watershed Management Division (NPDES)
  - Traffic and Lighting Division
  - Environmental Programs Division
  - Waterworks Division
  - Sewer Maintenance Division
- ☒ Fire Department
  - Forestry, Environmental Division
  - Planning Division
  - Land Development Unit
  - Health Hazmat
- ☒ Sanitation District
- ☒ Public Health/Environmental Health Division: Land Use Program (OWTS), Drinking Water Program (Private Wells), Toxics Epidemiology Program (Noise)
- ☒ Sheriff Department
- ☒ Parks and Recreation
- ☐ Subdivision Committee

## ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project.

- ☒ Aesthetics
- ☐ Agriculture/Forest
- ☒ Air Quality
- ☒ Biological Resources
- ☐ Cultural Resources
- ☐ Energy
- ☒ Geology/Soils
- ☒ Greenhouse Gas Emissions
- ☐ Hazards/Hazardous Materials
- ☒ Hydrology/Water Quality
- ☐ Land Use/Planning
- ☐ Mineral Resources
- ☒ Noise
- ☐ Population/Housing
- ☒ Public Services
- ☒ Recreation
- ☒ Transportation/Traffic
- ☒ Utilities/Services
- ☒ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Department.)
On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

______________________________ ____________________
Signature (Prepared by) Date

______________________________ ____________________
Signature (Approved by) Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources the Lead Department cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the Lead Department has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level. (Mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced.)

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA processes, an effect has been adequately analyzed in an earlier EIR or negative declaration. (*State CEQA Guidelines* § 15063(c)(3)(D).) In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of, and adequately analyzed in, an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

7) The explanation of each issue should identify: the significance threshold, if any, used to evaluate each question, and; mitigation measures identified, if any, to reduce the impact to less than significance. Sources of thresholds include the County General Plan, other County planning documents, and County ordinances. Some thresholds are unique to geographical locations.

8) Climate Change Impacts: When determining whether a project's impacts are significant, the analysis should consider, when relevant, the effects of future climate change on: (1) worsening hazardous conditions that pose risks to the project's inhabitants and structures (e.g., floods and wildfires), and (2) worsening the project's impacts on the environment (e.g., impacts on special status species and public health).

## 1. AESTHETICS

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Have a substantial adverse effect on a scenic vista?** | ☐ | ☐ | ☒ | ☐ |

The Marina del Rey Specific Plan contains view corridor requirements, which state that, where feasible, a minimum of 20 percent of the water frontage of a site shall be preserved as a view corridor. The project site faces the water along approximately 1,529 linear feet, consisting of 495 feet along Mindanao Way, 600 feet along Admiralty Way, and 434 feet along Bali Way. Based on the 20 percent requirement (which applies when, as here, building heights are kept under 45 feet), the proposed project would be required to provide view corridors totaling approximately 306 feet within the project site.[1]

The proposed project would provide a total of 822 linear feet of view corridor within the project site, which is well in excess of that required by the Marina del Rey Specific Plan for the project (i.e., 306 linear feet). The proposed project would not exceed the height limit allowed in the Marina del Rey Specific Plan as no structure would be over 45 feet. Therefore, while the proposed project would increase the intensity of development within the project site, the project would be consistent with County standards for the preservation and enhancement of scenic marina views. Impacts to scenic vistas would be less than significant.

| | | | | |
|---|---|---|---|---|
| **b) Be visible from or obstruct views from a regional riding or hiking trail?** | ☐ | ☐ | ☒ | ☐ |

The Marvin Braude Bike Path, a Class I Bike Path, crosses the project site southwest of Admiralty Way.[2] New structures within the project site would be visible from this path. However, project landside development would occur between the bike path and Admiralty way and would thus not obstruct views of the marina from the path (the proposed realignment of the bike path represents a significant public safety and Marina water viewshed enhancement for bikers, as the path currently meanders haphazardly through the parcel's surface parking area along the parcel's Admiralty Way frontage). Class II bike lanes are provided along both Bali Way and Mindanao Way. The proposed project would be visible by bicyclist traveling along these bike lanes. However, view corridors would be provided along both streets to allow for views of the marina. As discussed above under **threshold 1a**, the proposed project would exceed County requirements for view corridors. Impacts would be less than significant.

1 County of Los Angeles, Marina del Rey Specific Plan, Sec. 22.46.1060

2 County of Los Angeles, Bicycle Master Plan.

**c) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?** ☐ ☐ ☒ ☐

The nearest designated state scenic highway is State Route 2 approximately 12 miles northeast of the project site. State Route 1/Lincoln Boulevard, located approximately 200 feet northeast of the project site, is an eligible state scenic highway. However, views of the project site from State Route 1 are obscured by intervening development. The project site is not visible from any designated or eligible state scenic highway, and impacts would therefore be less than significant.

Source: Caltrans, "Officially Designated State Scenic Highways and Historic Parkways," http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm.

**d) Substantially degrade the existing visual character or quality of the site and its surroundings because of height, bulk, pattern, scale, character, or other features?** ☒ ☐ ☐ ☐

The proposed project would increase development intensity within the project site from 14,274 square feet of existing commercial space to approximately 83,778 square feet of visitor-serving and marine commercial space, retail and restaurant uses. Proposed improvements will have the capability of blocking views to the marina. Proposed development would be consistent with the commercial and boat-related character of surrounding development, and would not be expected to degrade the site's existing visual character; however, further analysis on this topic is warranted in the project EIR. As discussed above under **threshold 1a**, the proposed project would exceed County requirements for view corridors. Impacts would be significant without the provision of view corridors.

**e) Create a new source of substantial shadows, light, or glare which would adversely affect day or nighttime views in the area?** ☒ ☐ ☐ ☐

The new commercial structures proposed within the project site would increase the amount of shadow cast within and beyond the project site. The proposed "West Marine" retail building (Building IV) and the restaurant/retail building oriented to the corner of Bali Way and Admiralty Way (Building VI) would be the only two-story structures included in the proposed project and therefore would be the tallest structures within the project site. Shadows cast by structures within the project site would be cast toward Basin G (west) during morning hours and toward the Admiralty Way (east) during evening hours. The tall commercial structures northeast of the project site across Admiralty Way would not be considered sensitive to increased shadow. Since the structures northeast of the project site are taller than the proposed structures, new shadows cast in the evening hours would be minimal. The project's shade and shadow impacts are nonetheless considered potentially significant, and additional analysis is thus warranted in the project EIR.

New lighting within the project site would potentially increase the amount of light within the project site and surrounding areas. However, the project site and adjacent parcels currently have security and safety lighting. Project development would result in an incremental increase in light that would not adversely affect nighttime views.

Glare can result from the use of reflective building materials such as metal or glass. While project development would involve the use of such materials, the project does not proposed to use broad expanses of reflective building materials that could potentially create a source of glare that could affect passing motorists. Impacts under this threshold would be less than significant after mitigation and project design features.

## 2. AGRICULTURE / FOREST

*In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.*

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?** | ☐ | ☐ | ☐ | ☒ |

The project site is not located in an area that is designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance pursuant to the Farmland Mapping and Monitoring Program of the California Department of Conservation.[3] Further analysis regarding this topic is not required.

| | | | | |
|---|---|---|---|---|
| **b) Conflict with existing zoning for agricultural use, with a designated Agricultural Opportunity Area, or with a Williamson Act contract?** | ☐ | ☐ | ☐ | ☒ |

The project site is located in the County unincorporated community of Marina del Rey, which is designated as Specific Plan Zone as zoned under the County of Los Angeles. Parcel 44's land use designations per the certified Local Coastal Program (LCP) are Marine Commercial, Boat Storage, Visitor-serving/Convenience-commercial and Water with a Waterfront Overlay Zone designation.[4] The project site does not support and is not zoned for, nor is it located near an area that is zoned for or developed with, forestland or timberland. Therefore, no impacts would occur to agricultural land uses or conflict with any agricultural zones and further analysis on this topic is not required.

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3 California Department of Conservation, Farmland Mapping & Monitoring Program ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2010/

4 County of Los Angeles, Marina del Rey Specific Plan, Land Use Plan.

**c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code § 12220 (g)), timberland (as defined in Public Resources Code § 4526), or timberland zoned Timberland Production (as defined in Government Code § 51104(g))?** ☐ ☐ ☐ ☒

The project site is located in the County unincorporated community of Marina del Rey, which is designated as Specific Plan Zone as zoned under the County of Los Angeles. Parcel 44's land use designations per the certified LCP are Marine Commercial, Boat Storage, Visitor-serving/Convenience-commercial and Water with a Waterfront Overlay Zone designation.[5] The project site does not support and is not zoned for, nor is it located near an area that is zoned for or developed with, forestland or timberland. Therefore, no impacts would occur to agricultural land uses or conflict with any agricultural zones and further analysis on this topic is not required.

**d) Result in the loss of forest land or conversion of forest land to non-forest use?** ☐ ☐ ☐ ☒

The project site is located in the County unincorporated community of Marina del Rey, which is designated as Specific Plan Zone as zoned under the County of Los Angeles. Parcel 44's land use designations per the certified LCP are Marine Commercial, Boat Storage, Visitor-serving/Convenience-commercial and Water with a Waterfront Overlay Zone designation.[6] The project site does not support and is not zoned for, nor is it located near an area that is zoned for or developed with, forestland or timberland. Therefore, no impacts would occur to agricultural land uses or conflict with any agricultural zones, and further analysis on this topic is not required.

**e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?** ☐ ☐ ☐ ☒

The project site is located in the County unincorporated community of Marina del Rey, which is designated as Specific Plan Zone as zoned under the County of Los Angeles. Parcel 44's land use designations per the certified LCP are Marine Commercial, Boat Storage, Visitor-serving/Convenience-commercial and Water with a Waterfront Overlay Zone designation.[7] The proposed project site does not contain agricultural farmland nor is it near an area of agricultural farmland. Therefore, implementation of the proposed project would not convert farmland to non-agricultural land. No further analysis on this topic is required.

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5 County of Los Angeles, Marina del Rey Specific Plan, Land Use Plan.

6 County of Los Angeles, Marina del Rey Specific Plan, Land Use Plan.

7 County of Los Angeles, Marina del Rey Specific Plan, Land Use Plan.

## 3. AIR QUALITY

*Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.*

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Conflict with or obstruct implementation of applicable air quality plans of either the South Coast AQMD (SCAQMD)?** | ☒ | ☐ | ☐ | ☐ |

The proposed project falls under the jurisdiction of the SCAQMD. In conjunction with the Southern California Association of Governments (SCAG), the SCAQMD is responsible for formulating and implementing air pollution control strategies in the South Coast Air Basin (SCAB). The SCAQMD's Air Quality Management Plan (AQMP) was adopted in 2003 and updated in 2007 to establish a comprehensive air pollution control program leading to the attainment of California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) in the SCAB. The AQMP also addresses the requirements set forth in the California and Federal Clean Air Acts. Potential impacts on local and regional air quality may exceed SCAQMD thresholds due to construction and operation of the proposed project. Because construction and operation of the project may exceed the SCAQMD significance thresholds, the air quality emissions from the proposed project may have a significant impact. Consequently, the proposed project may potentially increase the frequency or severity of existing air quality violations, cause or contribute to new air quality violations, delay timely attainment of air quality standards, or the interim emission reductions specified in the AQMP. Based on the above discussion, the proposed project may potentially conflict with applicable regional plans or policies adopted by agencies with jurisdiction over the project. Therefore, the proposed project may not be consistent with the AQMP and could have a potentially significant impact with respect to this criterion.

| | | | | |
|---|---|---|---|---|
| **b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?** | ☒ | ☐ | ☐ | ☐ |

The proposed project is a redevelopment of Parcel 44 located in the community of Marina Del Rey in unincorporated Los Angeles County. The proposed project would replace 14,724 square feet (sf) of development consisting of office space, boat repair, and a yacht club with 83,778 sf, to include a grocery store, retail and restaurant space, a yacht club, offices, a lounge, a boat repair facility and boat storage uses. The project does not propose the addition of any new dwelling units. The additional square footage of space as part of the proposed project is not expected to exceed the state's criteria for regional significance; however, there is the potential for a significant project impact in this regard, and additional analysis is thus warranted in the project EIR.

**c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?** ☒ ☐ ☐ ☐

In 1993, the SCAQMD prepared its *California Environmental Quality Act (CEQA) Air Quality Handbook* to assist local government agencies and consultants in preparing environmental documents for projects subject to CEQA. The SCAQMD is in the process of developing an Air Quality Analysis Guidance Handbook to replace the *CEQA Air Quality Handbook*. While the Air Quality Analysis Guidance Handbook is being developed, supplemental information has been adopted by the SCAQMD. These include revisions to the air quality significance thresholds and a new procedure referred to as "localized significance thresholds," which has been added as a significance threshold under the Final Localized Significance Threshold Methodology.[8] The applicable portions of the *CEQA Air Quality Handbook*, the Air Quality Analysis Guidance Handbook supplemental information, and other revised methodologies were used in preparing the air quality analysis for this section.

<u>**Traffic Congestion**</u>

The proposed project includes the redevelopment of Parcel 44 with retail and boater-serving land uses in an existing commercial use corridor bounded by Bali Way to the north, Admiralty Way to the east, and Mindanao Way to the south, in Marina Del Rey. The proposed project may result in substantial additional traffic and consequent congestion due to the addition of retail space and other amenities. Additional analysis is warranted in the Project EIR.

<u>**CO Hotspots**</u>

Traffic congested roadways and intersections have the potential to generate localized high levels of carbon monoxide (CO). Localized areas where ambient concentrations exceed the state 1-hour standard of 20 parts per million (ppm) or the 8-hour standard of 9.0 ppm are termed CO hotspots. CO is produced in greatest quantities from vehicle combustion and is usually concentrated at or near ground level because it does not readily disperse into the atmosphere. As a result, potential air quality impacts to sensitive receptors are assessed through an analysis of localized CO concentrations. The project would replace 14,724 square feet (sf) of space with 83,778 sf of space which would represent a substantial expansion of its existing facilities, including new retail, restaurant and commercial space. As a result, the project would result in a substantial additional number of vehicle trips and would have the potential to create additional traffic congestion in the vicinity. Therefore, the proposed project may cause or contribute to CO hotspots and may be potentially significant with respect to this criterion. Additional analysis is warranted in the Project EIR.

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8 South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, (2008).

**Construction Emissions**

Construction activities have the potential to cause short-term impacts with respect to air quality standards. According to SCAQMD, project emissions are considered to cause a significant impact to air quality if they would exceed the SCAQMD threshold of significance for the following criteria pollutants: volatile organic compounds (VOC), nitrogen oxides ($NO_X$), CO, sulfur oxides ($SO_X$), respirable particulate matter (PM10), and fine particulate matter (PM2.5). The construction emissions associated with the proposed project will be estimated using the California Emissions Estimator Model (CalEEMod). CalEEMod is a program that calculates air pollutant emissions from land use development projects and incorporates factors specific to the Basin and the SCAQMD, such as VOC content in architectural coating and vehicle fleet mixes.

Site-specific or project-specific data to be used in the CalEEMod model will be provided by the project Applicant including the estimated construction schedule and information. The existing project site contains primarily commercial and retail space, including 584 sf of bathrooms, a 7,844 sf boat brokers' offices and buildings, a 1,080 sf yacht club, a 1,000 sf boat repair and a 4,216 sf office building. These existing uses would all be demolished as part of the proposed project. The proposed project would construct a variety of retail, office, restaurant and marine/boater-serving uses.

Project construction is anticipated to begin in the second quarter 2015 and to be completed by the end of 2016. Construction is anticipated to occur over a period of approximately 18 months. Project construction would include demolition, grading, trenching, building construction, architectural coating, and asphalt paving sub-phases. Due to the type and duration of construction activities, construction emissions from the proposed project may be potentially significant. The EIR will discuss this topic in greater detail.

**Operational Emissions**

Emissions from operation of the project have the potential to cause long-term impacts with respect to air quality standards. According to SCAQMD, a project's operational emissions are considered to cause a significant impact to air quality if they would exceed the SCAQMD threshold of significance for the following criteria pollutants: VOC, $NO_X$, CO, $SO_X$, PM10, and PM2.5. Operational emissions would be generated by both mobile and stationary sources as a result of normal day-to-day activities on the project site after occupation. Mobile emissions would be generated by the motor vehicles traveling to, from, and within the project site. Stationary emissions, both point source and area source, would be generated by the consumption of natural gas for space and water heating devices (including water heater and boilers). Given the size and types of development planned for the proposed project, operational emissions have the potential to exceed significance thresholds and may be significant. The EIR will discuss this topic in greater detail.

**Localized Significance Thresholds**

The SCAQMD recommends that the potential localized impacts be evaluated on the ambient air concentrations of NOx, CO, PM10, and PM2.5 due to on-site emissions. The evaluation requires that anticipated ambient air concentrations, determined using a computer based air quality dispersion model, be compared to localized significance thresholds. The thresholds for NOx and CO represent the allowable increase in concentrations above background levels in the vicinity of the project that would not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS). The threshold for PM10, which is 10.4 micrograms per cubic meter ($\mu g/m^3$), represents compliance with SCAQMD's Rule 403 (Fugitive Dust). The threshold for PM2.5, which is also 10.4 $\mu g/m^3$, is intended to constrain emissions to aid in progress toward attainment of the NAAQS and CAAQS.

The project site is located in Marina Del Rey, which is in SRA 2 (Northwest Los Angeles County Coastal). The entire project site area including waterside and submerged areas is 17.41 acres. Although the project site is located in a commercial use area, with few sensitive receptors nearby, Burton Chase Park is located adjacent to the project site to the southwest. Therefore, the proposed project has the potential to exceed local significance thresholds and therefore may have a significant impact. The EIR will discuss this topic in greater detail.

| | | | | |
|---|---|---|---|---|
| **d) Expose sensitive receptors to substantial pollutant concentrations?** | ☒ | ☐ | ☐ | ☐ |

According to the SCAQMD's *CEQA Air Quality Handbook*, projects that are within the emission thresholds identified above for construction and operation should be considered less than significant on a cumulative basis, unless there is other pertinent information to the contrary.[9] As discussed previously, emissions associated with construction and operation of the proposed project may potentially exceed SCAQMD-recommended significance thresholds and may therefore possibly cause an individually significant impact. Since both construction and operation emissions may exceed the thresholds of significance, the proposed project may possibly result in a significant cumulative impact; additional analysis is warranted in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **e) Create objectionable odors affecting a substantial number of people?** | ☐ | ☐ | ☒ | ☐ |

The land uses associated with the proposed project are not expected to cause odor nuisances, dust, and hazardous emissions. Construction of the project is temporary and is not expected to cause an odor nuisance. Refuse associated with operation of the proposed project will continue to be disposed of in accordance with applicable regulations. Therefore, the proposed project would not have a significant impact on air quality with respect to this criterion.

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[9] South Coast Air Quality Management District, CEQA Air Quality Handbook, (1993) 9–12.

## 4. BIOLOGICAL RESOURCES

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or U.S. Fish and Wildlife Service (USFWS)?** | ☒ | ☐ | ☐ | ☐ |

The project site is currently occupied by urbanized, commercial-retail land uses and surface parking lots without any common or sensitive natural habitat areas. There are no landside habitat areas that may support any federally or state-listed Endangered or Threatened species, such as the least tern that may occur at Venice Beach or foraging over the marina waters. Since the project site does not have any natural habitat areas that can be affected by project construction or infrastructure improvements, the proposed project is not expected to have a substantial adverse effect to a terrestrial species regulated by the California Department of Fish and Game or the US Fish and Wildlife Service. However, there is a slight possibility that special-status birds may nest in the landscape trees within or adjacent to the project site that many affect the breeding success for those species. Therefore, this topic will be further analyzed in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **b) Have a substantial adverse effect on any sensitive natural communities (e.g., riparian habitat, coastal sage scrub, oak woodlands, non-jurisdictional wetlands) identified in local or regional plans, policies, regulations or by CDFG or USFWS?** | ☐ | ☐ | ☒ | ☐ |

The project site is currently occupied by commercial-retail land uses and surface parking lots. The project site is urbanized and does not contain any natural habitat areas, sensitive or common. The proposed project is located within the state-designated Coastal Zone but is surrounded on all sides by urban land uses. The project site is not located within a designated Significant Ecological Area (SEA), coastal Sensitive Environmental Resource Area (SERA) or Environmentally Sensitive Habitat Area (ESHA). The closest SEA to the project site is the Ballona Creek SEA, located approximately 1 mile southeast of the project site. Because the project site is not located within or adjacent to an SEA or SERA, no impacts would occur from implementation of the proposed project. Impacts associated with sensitive nesting bird species is addressed in **4a**, above. Therefore, no further analysis would be required on this topic with respect to the project.

**c) Have a substantial adverse effect on federally or state protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, and drainages) or waters of the United States, as defined by § 404 of the federal Clean Water Act or California Fish & Game code § 1600, et seq. through direct removal, filling, hydrological interruption, or other means?** ☐ ☐ ☒ ☐

The project site is currently occupied by urbanized, commercial-retail land uses and surface parking lots without any common or sensitive natural habitat areas, including wetlands or waters of the United States. Since the project site does not have any natural terrestrial jurisdictional habitat areas that can be affected, removed, or filled by construction, fire clearance, or flood related improvements, there would be no impacts.

**d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?** ☒ ☐ ☐ ☐

The project site is not adjacent to or located in a wildlife corridor, nor is it adjacent to an open space linkage. The above discussion regarding impacts associated with redevelopment of the project site to nesting and roosting birds such as the Great Blue Heron, Black-crowned Night Heron, Double-crested Cormorant, and the Great Egret conclude that there is the potential for impacts to occur. Therefore, this topic will be further discussed in the Project EIR.

**e) Convert oak woodlands (as defined by the state, oak woodlands are oak stands with greater than 10% canopy cover with oaks at least 5 inch in diameter measured at 4.5 feet above mean natural grade) or otherwise contain oak or other unique native trees (junipers, Joshuas, Southern California black walnut, etc.)?** ☐ ☐ ☐ ☒

The project site is currently occupied by urbanized, commercial-retail land uses and surface parking lots without any natural habitat areas. There are no habitat areas that support oak woodlands and no native trees occur on the project site. Therefore, no oak resources would be impacted and no further analysis is required.

| | | | | |
|---|---|---|---|---|
| **f) Conflict with any local policies or ordinances protecting biological resources, including Wildflower Reserve Areas (L.A. County Code, Title 12, Ch. 12.36), the Los Angeles County Oak Tree Ordinance (L.A. County Code, Title 22, Ch. 22.56, Part 16), the Significant Ecological Areas (SEAs) (L.A. County Code, Title 22, § 22.56.215), and Sensitive Environmental Resource Areas (SERAs) (L.A. County Code, Title 22, Ch. 22.44, Part 6)?** | ☒ | ☐ | ☐ | ☐ |

The project site is currently occupied by urbanized, commercial-retail land uses and surface parking lots without any natural habitat areas. There are no habitat areas that support oak resources on the project site, so the Oak Tree Ordinance would not apply to the proposed project. The project site is not located in or near a Wildflower Reserve Area or a Significant Ecological Area. Although the project site is located within the Coastal Zone and special-status birds may potentially nest in the ornamental trees, a potential impact to nesting birds may occur. Therefore, this topic will be further discussed in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **g) Conflict with the provisions of an adopted state, regional, or local habitat conservation plan?** | ☐ | ☐ | ☐ | ☒ |

The project site is currently occupied by urbanized, commercial-retail land uses and surface parking lots without any natural habitat areas. There are no habitat areas that support native biological resources on the project site. The proposed project would not conflict with any adopted state, regional, or local habitat conservation plan, as none exist in the project vicinity. Therefore, the proposed project would not conflict with provisions of any habitat conservation plan and no further analysis is required.

## 5. CULTURAL RESOURCES

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines § 15064.5?** | ☐ | ☐ | ☐ | ☒ |

The project site is not considered a historical site nor does it contain historical structures. The proposed project site does not contain known historic structures and is not considered a historic site according to the Office of Historic Preservation.[10] Furthermore, the Marina del Rey Land Use Plan does not identify any known historical structures or sites within the community of Marina Del Rey. Implementation of the proposed project would not include renovation of a historic structure or historic site. Therefore, the proposed project would have no impact on historical resources and no further analysis is required.

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5?** | ☐ | ☐ | ☒ | ☐ |

The project site is located in an area of Marina del Rey that is currently developed and has been developed for the past 50 years. The project site does not contain known archaeological resources, drainage courses, springs, knolls, rock outcroppings, or oak trees that indicate potential archaeological sensitivity. Demolition and export of underlying soil and debris would take place during the redevelopment process. The closest area containing known archaeological resources is the Ballona Creek Watershed area, approximately 1 mile south from the project site, where remnants of past human activity have been located. Any resources on Marina del Rey land already altered or designated for development have already been impacted. The proposed project would thus have a less than significant impact on archaeological resources and no further analysis is required.

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10 Office of Historic Preservation, California State Parks, California Historical Resources, http://ohp.parks.ca.gov/listedresources/; Los Angeles County Local Coastal Program, Marina Del Rey Land Use Plan

**c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or contain rock formations indicating potential paleontological resources?** ☐ ☐ ☐ ☒

The proposed project site is currently developed with commercial structures and surface parking lots. As described above, the proposed project site has been urbanized over the past 50 years and the likelihood of paleontological resources existing under the project site is limited. The proposed project would involve limited excavation on-site with no unique geologic feature. Additionally, the project site is not adjacent to any unique geologic features. Since the proposed project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature there would be no impacts. Further analysis on this topic would not be required.

**d) Disturb any human remains, including those interred outside of formal cemeteries?** ☐ ☐ ☐ ☒

The project site is not known to contain any human remains. Furthermore, the proposed project entails minimal excavation and grading as only minor surface grading is proposed. Therefore, the proposed project would have no impact on human remains and no further analysis is required.

## 6. ENERGY

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Conflict with Los Angeles County Green Building Ordinance (L.A. County Code Title 22, Ch. 22.52, Part 20 and Title 21, § 21.24.440) or Drought Tolerant Landscaping Ordinance (L.A. County Code, Title 21, § 21.24.430 and Title 22, Ch. 22.52, Part 21)?** | ☐ | ☐ | ☒ | ☐ |

The proposed project would comply with the County Green Building Ordinance and would be designed in compliance with the County of Los Angeles Green Building Standards. Further, the project would be developed in compliance with all state and local regulations related to energy conservation, and would comply with the County's Drought Tolerant Landscaping Ordinance. Therefore, project impacts would be less than significant and additional analysis is not required.

| | | | | |
|---|---|---|---|---|
| **b) Involve the inefficient use of energy resources (see Appendix F of the CEQA Guidelines)?** | ☐ | ☐ | ☒ | ☐ |

Project energy use would consist of fuel during the construction of the proposed project and electricity and fuel during project operation. The commercial development proposed would comply with applicable state regulations regarding energy efficiency and would not be expected to use extraordinary amounts of energy or to involve inefficient use of energy resources.[11] Therefore, project impacts would be less than significant and additional analysis is not required.

[11] California Energy Commission, 2008 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, 2010.

## 7. GEOLOGY AND SOILS

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:** | | | | |
| **i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known active fault trace? Refer to Division of Mines and Geology Special Publication 42.** | ☐ | ☐ | ☒ | ☐ |

The project site is not located within a mapped Alquist-Priolo Earthquake Fault Zone.[12] The Marina del Rey Specific Plan, which applies to the proposed project, requires that all projects within the specific plan area provide a comprehensive geologic and soils analysis to identify and delineate areas of potential seismic hazard, and to provide adequate mitigation for such hazards. Since the project site is not identified as an Alquist-Priolo Earthquake Fault Zone, impacts would be less than significant.

12 California Department of Conservation, "Alquist-Priolo Earthquake Fault Zones," http://www.consrv.ca.gov/cgs/rghm/ap/Pages/index.aspx; County of Los Angeles, Marina del Rey Specific Plan, Sec. 22.46.1180.

| | | | | |
|---|---|---|---|---|
| **ii) Strong seismic ground shaking?** | ☐ | ☐ | ☒ | ☐ |

As discussed under **threshold 7a(i)**, above, the project site is not located within a mapped Alquist-Priolo Earthquake Fault Zone.[13] The project site is located in a seismically active region, and would be subjected to ground shaking during future seismic events. The Charnock Fault and Overland Fault, which lie respectively 2.75 miles and 5.5 miles to the east of Marina del Rey, are part of the major Newport-Inglewood Fault Zone[14]. The Santa Monica Fault lies about 4.4 miles from the project site[15]. Furthermore, the Malibu Coast Fault lies approximately 7 miles to the northwest of Marina del Rey and is considered a potentially active fault. Both of these faults are capable of producing earthquakes up to a magnitude of 7.0.

The Marina del Rey Specific Plan, which applies to the proposed project, requires that all new construction use earthquake-resistant construction and engineering practices.. Implementation of these requirements and seismic safety standards provided in the California Building Code, as enforced by the County Department of Public Works (DPW), would reduce the potential adverse effects of seismic ground shaking to less than significant.

| | | | | |
|---|---|---|---|---|
| **iii) Seismic-related ground failure, including liquefaction and lateral spreading?** | ☒ | ☐ | ☐ | ☐ |

The proposed project is an urban infill development that would increase the intensity of development on a currently developed site. The proposed project site is located in an area that has been designated as a liquefiable area.[16] Furthermore, the proposed project is located within an area having a high groundwater level.[17] Site-specific geotechnical studies would be required for new development under the Marina del Rey Specific Plan and DPW's geotechnical and seismic review procedures (see discussion under **threshold 7a[ii]**, above). Should the geotechnical study identify any potential for seismic-related ground failure, development in areas subject to such hazards would be prohibited unless adequate mitigation is identified and implemented. Additional analysis of potential seismic hazards associated with the project, and mitigation measures intended to reduce such impacts to a level of insignificance, is warranted in the Project EIR.

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13 California Department of Conservation, "Alquist-Priolo Earthquake Fault Zones," http://www.consrv.ca.gov/cgs/rghm/ap/Pages/index.aspx; County of Los Angeles, Marina del Rey Specific Plan, Sec. 22.46.1180.

14 County of Los Angeles, Department of Regional Planning, Marina Del Rey Land Use Plan, February 9, 1996, pg. 10-1.

15 Group Delta Consultants. Geotechnical Engineering Report, Proposed Commercial and Retail Development, Marina del Rey – Parcel 44. June 1, 2012.

16 County of Los Angeles, Department of Regional Planning, County of Los Angeles General Plan, Safety Element, Plate 4, Liquefaction Susceptibility.

17 County of Los Angeles, Department of Regional Planning, County of Los Angeles General Plan, Safety Element, Plate 3, Shallow and Perched Groundwater.

| | | | | |
|---|---|---|---|---|
| **iv) Landslides?** | ☐ | ☐ | ☐ | ☒ |

The proposed project site is located on land that is topographically flat. There are no hills, mounds, or mountains located on the proposed project site. Furthermore, the surrounding area of the project site is topographically flat as well. The proposed project is not located in an area containing a major landslide; therefore, there would be no impacts, and no further analysis would be required.

| | | | | |
|---|---|---|---|---|
| **b) Result in substantial soil erosion or the loss of topsoil?** | ☐ | ☐ | ☒ | ☐ |

The proposed project site is located on land that is topographically flat. There are no hills, mounds, or mountains located on the proposed project site. Furthermore, the surrounding area of the project site is topographically flat. The proposed project is currently developed with a surface parking lot, and commercial retail structures. An adequate drainage system currently exists on the project site. Since the project site is currently developed with non-permeable surfaces and would remain so developed with implementation of the proposed project, the project site would not be subject to high erosion. Because the proposed project is not located in an area containing easily erodible soil, there would be no impacts, and no further analysis would be required. Moreover, the applicant will be required to comply with all applicable National Pollutant Discharge Elimination Service (NPDES) and low-impact development building requirements affecting site drainage to the satisfaction of LA County Division of Building & Safety.

| | | | | |
|---|---|---|---|---|
| **c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?** | ☒ | ☐ | ☐ | ☐ |

See discussion under **threshold 7a(iii)**, above.

| | | | | |
|---|---|---|---|---|
| **d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?** | ☒ | ☐ | ☐ | ☐ |

See discussion under **threshold 7a(iii)**, above.

| | | | | |
|---|---|---|---|---|
| **e) Have soils incapable of adequately supporting the use of onsite wastewater treatment systems where sewers are not available for the disposal of wastewater?** | ☐ | ☐ | ☐ | ☒ |

No on-site wastewater treatment systems such as septic systems are proposed as part of the project. Therefore no further consideration of this issue is needed.

| | | | | |
|---|---|---|---|---|
| **f) Conflict with the Hillside Management Area Ordinance (L.A. County Code, Title 22, § 22.56.215) or hillside design standards in the County General Plan Conservation and Open Space Element?** | ☐ | ☐ | ☐ | ☒ |

The proposed project site is not located in a designated hillside management area. Therefore, no impact would occur.

## 8. GREENHOUSE GAS EMISSIONS

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Generate greenhouse gas (GHGs) emissions, either directly or indirectly, that may have a significant impact on the environment?** | ☒ | ☐ | ☐ | ☐ |

Construction of the proposed project would result in one-time emissions of greenhouse gases (GHGs). These emissions, primarily carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$), are the result of fuel combustion by construction equipment and motor vehicles. The other primary GHGs (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) are typically associated with specific industrial sources and are not expected to be emitted by the proposed project. The project's GHG emissions were estimated using CalEEMod using the same parameters for criteria pollutants.

The SCAQMD recommends amortizing construction-related GHG emissions over a project's lifetime in order to include these emissions as part of a project's annualized lifetime total emissions, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies. The SCAQMD has defined a project lifetime to be a 30-year period. In accordance with this methodology, the project's construction GHG emissions have been amortized over a 30-year period.

At full buildout, the project would result in direct annual emissions of GHGs during project operation. These emissions, primarily $CO_2$, $CH_4$, and $N_2O$, are the result of fuel combustion from building heating systems and motor vehicles. Building and motor vehicle air conditioning systems may use hydrofluorocarbons (and hydrochlorofluorocarbons and chlorofluorocarbons to the extent that they have not been completely phased out at later dates).

The SCAQMD has not yet formally adopted significance thresholds for emissions of GHG. However, a SCAQMD working group has produced draft guidance that includes proposed significance thresholds for land use projects. The draft threshold applicable for mixed-use or all land use projects is 3,000 metric tons of carbon dioxide equivalents per year ($MTCO_2e$/year).

It is generally the case that an individual project is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory.[18] GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective.[19] The proposed project includes a mix of retail and commercial land uses. As these types of land uses often result in increased traffic and substantial

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18 California Air Pollution Control Officers Association, CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, (2008) 35.

19 CAPCOA, CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions, (2008) 35.

energy use, there is likely to be an associated substantial increase in GHG emissions from the site. These increased emissions may exceed the SCAQMD draft significance thresholds for GHG emissions. Therefore, the project may potentially have a significant impact on GHG emissions. The EIR will discuss this topic in greater detail.

| | | | | |
|---|---|---|---|---|
| **b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?** | ☒ | ☐ | ☐ | ☐ |

On January 16, 2007, the Los Angeles County Board of Supervisors instructed the Directors of Regional Planning and Public Works to create a green building program that would incorporate green building standards into all appropriate industrial, commercial, and residential development Projects within all unincorporated areas of the County. The green building program was approved by the Board on November 18, 2008 and became effective on January 1, 2009. However, the green building program applies to new buildings or first-time tenant improvements greater than or equal to 10,000 square feet. The Green Building Technical Manual[20] describes that the program would require non-residential projects greater than 10,000 to meet certain minimum standards.

The low impact development (LID) ordinance requires the use of LID principles in development projects. LID encourages site sustainability and smart growth in a manner that respects and preserves the characteristics of the County's watersheds, drainage paths, water supplies, and natural resources. Non-residential projects that alter less than 50 percent of the existing impervious surface must comply with LID best management practices that promote infiltration and beneficial use of stormwater runoff for the altered portion. If greater than 50 percent of the existing impervious surface is altered, the entire site must comply with LID best management practices.

The drought-tolerant landscaping ordinance establishes minimum standards for the design and installation of landscaping using drought-tolerant and native plants that require minimal use of water. The requirements ensures that the County conserves water resources by requiring landscaping that is appropriate to the region's climate and nature of the use. Projects consisting of new non-residential buildings or first-time tenant improvements greater than or equal to 10,000 square feet shall use drought-tolerant plants for at least 75 percent of all landscaping and require that all turf be water-efficient and limited to 25 percent of all landscaped area not to exceed 5,000 square feet (minimum of 5 feet width for all turf areas).

The proposed project is required to comply with the County of Los Angeles green building, LID, and drought-tolerant landscaping ordinances. Therefore, the new buildings will be constructed to exceed Title 24 (2005) by at least 15 percent and meet LEED certification or equivalent. The project will incorporate features in the project design to ensure that the project reduces GHG emissions consistent with the County of Los Angeles green building, LID, and drought-tolerant landscaping ordinances. However, specific project features to be included in the proposed project that will enable this compliance are not currently available. Consequently, there is the possibility that the proposed project may conflict with plans to reduce GHG emissions. The EIR will discuss this topic in greater detail.

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20 County of Los Angeles. Draft Green Building Technical Manual. 2011.

# 9. HAZARDS AND HAZARDOUS MATERIALS

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Create a significant hazard to the public or the environment through the routine transport, storage, production, use, or disposal of hazardous materials?** | ☐ | ☐ | ☒ | ☐ |

The development proposed under the project would not require the routine use of acutely hazardous materials. Typical hazardous materials that would be expected to be used on the project site would include cleaning products associated with the retail, commercial and restaurant portions of the site and fuel for boats within the marina. The proposed project does not include provisions for storage of large quantities of boat fuel on-site. While some hazardous materials would be present within the project site, the proposed project would not be expected to create a significant hazard related to such materials. For example, paint, solvents, and cleaners may be used in conjunction with the proposed boat repair shop; however, any unused paint, solvents, or cleaners would be disposed of in conformance with applicable regulations and the spent cans recycled. Impacts would thus be less than significant and additional analysis is not warranted.

| | | | | |
|---|---|---|---|---|
| **b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials or waste into the environment?** | ☐ | ☐ | ☒ | ☐ |

The proposed project could use hazardous materials such as paints, cleaning agents, aerosol cans, landscaping-related chemicals, and common household substances such as bleaches during construction and renovation activities on the project site, as well as during operation of the uses on the project site upon buildout. All uses and storage of these materials would be subject to federal, state, and local laws pertaining to the use, storage, and transportation of these hazardous materials. Most of the hazardous materials indicated above are allowed to be disposed of at the local Class II and Class III landfills that serve the proposed project site and community of Marina del Rey. Since the proposed project would be required to abide by federal, state, and local laws pertaining to the use, storage, and transportation of these materials, the likelihood of an accidental release occurring and creating a significant hazard to the public would be minimal. Therefore, impacts would be less than significant. No further analysis is required on this topic.

**c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of sensitive land uses?** ☐ ☐ ☒ ☐

The project site is located within 0.25 mile of sensitive land uses; however, the proposed project would not include the storage of large quantities of hazardous materials or pressurized tanks. Consequently, there would be less than significant impacts. Further analysis on this topic is not required.

**d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?** ☐ ☐ ☐ ☒

The project site is not located on a parcel of land that has been included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5[21]. The closest site that is included on a list of hazardous materials sites is located at 4144 Glencoe Avenue, approximately 0.5 mile north of the project site. Since the proposed project site is not located on a site that is listed as a hazardous materials site, there would be no impacts. Further analysis on this topic would not be required.

**e) For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?** ☐ ☐ ☐ ☒

The project site is located approximately 2.2 miles to the northwest of Los Angeles International Airport (LAX) and approximately 1.9 miles south of the Santa Monica Airport. The project site is not located within 2 miles of LAX, is not located within the Santa Monica Airport Influence Area,[22] is not located in the LAX Airport Influence Area,[23] and would not result in a safety hazard for people in the project area. No impacts would occur and further analysis on this topic would not be required.

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21 California Department of Toxic Substances Control, Envirostor Database

22 Los Angeles County Department of Regional Planning, Los Angeles County Airport Land Use Commission, Santa Monica Airport Influence Area, http://planning.lacounty.gov/assets/upl/project/aluc_airport-santa-monica.pdf.

23 Los Angeles County Department of Regional Planning, Los Angeles County Airport Land Use Commission, LAX Airport Influence Area, http://planning.lacounty.gov/assets/upl/project/aluc_airport-lax.pdf.

**f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?** ☐ ☐ ☐ ☒

There are no private airstrips in the project site vicinity and no safety hazard impact would occur. Further analysis is not required.

**g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?** ☐ ☐ ☐ ☒

The project site is located in Marina del Rey, which is an unincorporated portion of the County of Los Angeles. The project site would be subject to the Operational Area Emergency Response Plan (the OAERP), which is prepared by the Office of Emergency Management.[24] Implementation of the proposed project would not change current evacuation routes from off the project site. Furthermore, development of the proposed project would not physically interfere with the OAERP. No impacts would occur and further analysis on this topic is not required.

**h) Expose people or structures to a significant risk of loss, injury or death involving fires, because the project is located:**

**i) within a Very High Fire Hazard Severity Zones (Zone 4)?** ☐ ☐ ☐ ☒

The project site is not located within a Very High Fire Hazard Severity Zone. Therefore, the project would have no impact on fire safety.

**ii) within a high fire hazard area with inadequate access?** ☐ ☐ ☐ ☒

The project site is not located in a high fire hazard zone and there is adequate emergency access. In addition, a fire lane is a component of the proposed project. Therefore, the project would have no impact on fire safety.

**iii) within an area with inadequate water and pressure to meet fire flow standards?** ☐ ☐ ☒ ☐

The proposed project will be required to meet all fire safety requirements including the need to provide adequate fire flow in the event of a fire hazard; adequate fire flows for the project will be a required to be demonstrated by the applicant prior to issuance of project building permits. There would be a less than significant impact from the project to fire safety in regard to fire flow.

24 Los Angeles County Department of Regional Planning, Draft General Plan 2008, Safety Element, pg. 176.

**iv) within proximity to land uses that have the potential for dangerous fire hazard?** ☐ ☐ ☐ ☒

The project site is not located in proximity to land uses with the potential for dangerous fire hazard. The project site is surrounded by primarily residential and office commercial land uses. Therefore, the project would have a less than significant impact with respect to its proximity to land uses that have the potential for dangerous fire hazard; no further analysis on this topic is warranted.

**i) Does the proposed use constitute a potentially dangerous fire hazard?** ☐ ☐ ☒ ☐

The project consists of commercial retail and boater-serving development, the majority of which would not constitute a potentially dangerous fire hazard. The project plans will be reviewed by Fire Department staff during the application review process and project design features, if necessary, will be incorporated into the plans, prior to their approval by the County, to mitigate potential fire hazards. Therefore, the proposed project will result in less than significant impacts related to a potentially dangerous fire hazard.

## 10. HYDROLOGY AND WATER QUALITY

| **Would the project:** | **Potentially Significant Impact** | **Less Than Significant Impact with Mitigation Incorporated** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **a) Violate any water quality standards or waste discharge requirements?** | ☐ | ☒ | ☐ | ☐ |

Compliance with the County Department of Public Works–administered NPDES/MS4 permit would ensure that construction runoff does not exceed discharge requirements. A detailed drainage plan and study will be required to analyze potential runoff from the project site during operation. These plans will be further discussed in the EIR for the proposed project.

| | | | | |
|---|---|---|---|---|
| **b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?** | ☐ | ☐ | ☐ | ☒ |

The project site is currently paved and developed with commercial structures and paved parking and storage areas, and the site, therefore, offers limited opportunities for groundwater recharge. The project does not propose any extraction of groundwater and therefore the proposed project would not cause any impacts to groundwater resources or to groundwater recharge. Further analysis on this topic is not required.

| | | | | |
|---|---|---|---|---|
| **c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?** | ☐ | ☒ | ☐ | ☐ |

Compliance with the County Department of Public Works–administered NPDES/MS4 permit would ensure that construction runoff does not exceed discharge requirements. A detailed drainage plan and study will be required to analyze potential runoff from the project site during operation.

**d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?**

☐ ☒ ☐ ☐

The proposed project site contains an existing drainage system that is adequate in terms of capacity but requires upgrading in regards to modern stormwater management and the County's Low Impact Development (LID) Program. For this reason, it is anticipated that drainage patterns and runoff quantities of the project site would remain substantially the same size as under current conditions, with the addition of a belt of bio-retentive grasscrete and gravel sub base for proper treatment of stormwater runoff. Runoff would continue to outlet through the storm drain system after such treatment. The aforementioned stormwater management improvements would not significantly alter the existing drainage pattern of the site or area and would only be introduced to treat and retain runoff in compliance with the County's LID Program. The project's conformance with the County's LID drainage requirements will ensure that site drainage impacts will be mitigated in accordance with the County's most current standards.

**e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

☐ ☒ ☐ ☐

The project site is currently developed with commercial structures and paved parking and storage areas. The proposed project would have the same or less runoff entering the stormwater drainage system as the current site condition. However, a detailed drainage plan and study will be required to analyze potential runoff from the project site during operation.

**f) Generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality?**

☐ ☒ ☐ ☐

The project site is currently developed with commercial structures and paved parking and storage areas. Compliance with the County Department of Public Works–administered NPDES/MS4 permit would ensure that construction runoff does not exceed discharge requirements. A detailed drainage plan and study will be required to analyze potential runoff from the project site during operation.

**g) Conflict with the Los Angeles County Low Impact Development_Ordinance (L.A. County Code, Title 12, Ch. 12.84 and Title 22, Ch. 22.52)?** ☐ ☐ ☒ ☐

The project site contains an existing drainage system that is adequate in terms of capacity but requires upgrading in regards to modern stormwater management and the County's Low Impact Development (LID) Program. For this reason, it is anticipated that drainage patterns and runoff quantities of the project site would remain substantially the same size as under current conditions with a gravel sub base for proper treatment of stormwater runoff. Runoff would continue to outlet through the storm drain after such treatment. The aforementioned stormwater management improvements would not alter the existing drainage pattern of the site or area and would only be introduced to treat and retain runoff in compliance with the County's LID Program. Compliance with the LID requirements will be achieved through the implementation of the Drainage Concept, approved by Department of Public Works preceding the issuance of any project grading or building permits.

**h) Result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance?** ☐ ☐ ☐ ☒

The Marina basin and, therefore, the project site is not located within an area designated as an Area of Special Biological Significance (ASBS).[25] Therefore, the proposed project would not impact an ASBS. No further analysis is required.

**i) Use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water (including, but not limited to, streams, lakes, and drainage course)?** ☐ ☐ ☐ ☒

The proposed project would not provide on-site wastewater treatment facilities. No further study of this issue would be necessary.

**j) Otherwise substantially degrade water quality?** ☐ ☒ ☐ ☐

The project site is currently an urbanized development with commercial buildings and surface parking and storage areas. Compliance with the County Department of Public Works–administered NPDES/MS4 permit would ensure that construction runoff does not exceed discharge requirements. A detailed drainage plan and study will be required to analyze potential runoff from the project site during operation.

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25 State Water Resources Control Board, *State Water Quality Protection Areas of Special Biological Significance*, http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs_areas.shtml

**k) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, or within a floodway or floodplain?** ☐ ☐ ☐ ☒

The project is not located within a floodway, floodplain, or other flood hazard area. Moreover, the proposed project contains no housing component. Therefore, the project would create no impacts with respect to this topic area and no further analysis is required.

**l) Place structures, which would impede or redirect flood flows, within a 100-year flood hazard area, floodway, or floodplain?** ☐ ☐ ☐ ☒

The project site is not located within a floodway, floodplain, or other flood hazard area and no structures would be placed within a floodway, floodplain, or other flood hazard area. Therefore, the project would create no impacts with respect to this topic area and no further analysis is required.

**m) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?** ☐ ☐ ☐ ☒

The project site is not located within a floodway, floodplain, or other flood hazard area and no structures would be placed within a floodway, floodplain, or other flood hazard area. Moreover, the subject property is not located within the flood inundation area of any dam or levee that could potentially fail. Therefore, the project would create no impacts with respect to this topic area and no further analysis is required.

**n) Place structures in areas subject to inundation by seiche, tsunami, or mudflow?** ☒ ☐ ☐ ☐

The proposed project would not be subject to hazards from mudflow or seiche. The proposed project is located within the Marina del Rey Harbor, along the Southern California coastline. The potential exists for communities along low-lying areas of the Southern California coastline to experience flooding due to tsunamis caused by earthquakes or underwater landslides. The maximum expected run-up of a tsunami in the local area of the project site is 9.6 feet in a 100-year interval and 15.3 feet in a 500-year interval.[26] Tsunamis generated from local earthquakes may be larger than distant earthquakes but are less likely to occur. Potential tsunami hazards will require further evaluation in the EIR.

26 County of Los Angeles, Department of Regional Planning, Marina del Rey Land Use Plan, February 9, 1996, pg. 10-4.

## 11. LAND USE AND PLANNING

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Physically divide an established community?** | ☐ | ☐ | ☐ | ☒ |

The project site is located in an area of Marina del Rey that is highly urbanized. Existing residential structures, commercial structures, parking lots, and parks are located around the proposed project site. The proposed project would not divide an established community; therefore, there would be no impacts. No further analysis on this topic is required.

| | | | | |
|---|---|---|---|---|
| **b) Be inconsistent with the applicable County plans for the subject property including, but not limited to, the General Plan, specific plans, local coastal plans, area plans, and community/neighborhood plans?** | ☐ | ☐ | ☐ | ☒ |

The project site is designated as "Marine Commercial," "Visitor-Serving/Convenience Commercial," "Boat Storage, with Waterfront Overlay," and "Water" in the Marina del Rey Specific Plan Land Use Plan. The proposed redevelopment of the existing commercial structures and storage areas with new commercial retail and boater-serving services is consistent with the applicable Specific Plan land use designations and development standards for project site. There would be no impact. No further analysis on this topic is required.

| | | | | |
|---|---|---|---|---|
| **c) Be inconsistent with the County zoning ordinance as applicable to the subject property?** | ☐ | ☐ | ☐ | ☒ |

The proposed project is zoned as Marina del Rey Specific Plan under the Los Angeles County Zoning Ordinance. Furthermore, the Marina del Rey Land Use Plan designates the project as "Marine Commercial," "Visitor-Serving/Convenience Commercial," "Boat Storage" and "Water" with the "Waterfront Overlay Zone" designation. Per the controlling Marina del Rey Local Coastal Program (of which the Specific Plan and Land Use Plan are a part), the subject property is zoned for the development of the project's proposed visitor-serving/convenience commercial, marine commercial and boat storage uses. As such, the proposed project would not be inconsistent with the County zoning ordinance as applicable to the subject property. There would be no impact. No further analysis on this topic is required.

**d) Conflict with Hillside Management criteria, Significant Ecological Areas conformance criteria, or other applicable land use criteria?**

☐ ☐ ☐ ☒

The proposed project is not located within an area subject to Hillside Management policies or within a Significant Ecological Area. Project development would therefore not conflict with policies or criteria of such programs. There would be no impact. No further analysis on this topic is required.

## 12. MINERAL RESOURCES

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?** | ☐ | ☐ | ☐ | ☒ |

The project site is not located within a Mineral Resource Zone as mapped by the County of Los Angeles.[27] The proposed project would not impact a known mineral resource area and no further analysis is required.

| | | | | |
|---|---|---|---|---|
| **b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?** | ☐ | ☐ | ☐ | ☒ |

The project site is not located within a Mineral Resource Zone as mapped by the County of Los Angeles. However, the project site is located within an Oil and Gas Resource Zone.[28] The project site is developed with commercial-retail land uses and does not currently contain existing drilling sites for the recovery of oil and natural gas, nor are any drilling sites located on the project site for the recovery of oil or natural gas proposed in the future. There would be no impacts to oil and natural gas resources with implementation of the proposed project. The proposed project would not result in the loss of availability of a locally important mineral resource recovery site delineated within the County of Los Angeles General Plan or the Marina del Rey Specific Plan. No further analysis is required.

27 County of Los Angeles Draft General Plan, Chapter 6 Conservation and Open Spaces Element, Figure 6.5, Natural Resource Areas, 2008.

28 County of Los Angeles Draft General Plan, Chapter 6 Conservation and Open Spaces Element, Figure 6.5, Natural Resource Areas, 2008.

## 13. NOISE

| Would the project result in: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Exposure of persons to, or generation of, noise levels in excess of standards established in the County General Plan or noise ordinance (Los Angeles County Code, Title 12, Chapter 12.08), or applicable standards of other agencies?** | ☒ | ☐ | ☐ | ☐ |

The project site is located in the unincorporated community of Marina del Rey, a highly urbanized area that is within the Marina del Rey Specific Plan area pursuant to the County of Los Angeles Zoning Code. Noise monitoring over a 24-hour period will be conducted at three different locations to measure ambient noise levels for analysis of both construction and operational impacts on nearby sensitive noise receptors (e.g., Burton Chase Park). This topic will be further analyzed in the EIR.

| | | | | |
|---|---|---|---|---|
| **b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?** | ☒ | ☐ | ☐ | ☐ |

The proposed project is not considered a sensitive use and the closest sensitive use is Burton W. Chase Park at the end of Mindanao Way. Because pile driving may occur with the construction of proposed structures, sensitive uses may be exposed to excessive ground vibration and/or groundborne noise levels. Impacts associated with ground vibration and groundborne noise will be further analyzed in the EIR.

| | | | | |
|---|---|---|---|---|
| **c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from parking areas?** | ☐ | ☐ | ☒ | ☐ |

The proposed project would increase the intensity of the land uses on the project site when compared to existing conditions. The project would construct new commercial structures to replace the existing seven buildings on the site and would result in an increase from 14,724 square feet to approximately 83,778 square feet. The proposed project would not include any new substantial sources of stationary noise, such as an amplified outdoor sound system. Ambient noise level upon completion of the redevelopment of the commercial, retail and restaurant use, and surface parking would not be substantially increased during project operation. The project would result in a less than significant impact with respect to this topic area and no additional analysis is thus required.

**d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from amplified sound systems?** ☒ ☐ ☐ ☐

Construction activities would include demolition, grading, building construction, paving, and potentially pile driving. During demolition and grading activities, equipment such as backhoes, a grader, a loader, a scraper would be used. Building construction would use a crane and forklift. Paving activities would use a paver and roller. Off-highway trucks would also be used to transport materials to the site. The loudest expected noise level that at the nearest sensitive receptors would experience during the redevelopment phases could be greater than 80 A-weighted decibels (dB(A)) Equivalent Continuous Sound Level (Leq), which is the standard for sensitive land uses. Temporary noise impacts from construction will be analyzed in the EIR.

**e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?** ☐ ☐ ☐ ☒

The project site is not located within the Los Angeles International Airport or Santa Monica Airport land use plan and would not expose people to excessive noise levels. The project would have no impact related to airport noise.

**f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?** ☐ ☐ ☐ ☒

The project site is not located adjacent or near a private airstrip and would not expose receptors to excessive noise levels. The project would have no impact related to noise from a private airstrip. .

## 14. POPULATION AND HOUSING

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?** | ☐ | ☐ | ☒ | ☐ |

Infrastructure, such as sewage disposal, roads, water conveyance systems, natural gas lines, and electrical lines, currently exist and serve the project site. Installation of new infrastructure systems would not be required with implementation of the proposed project, though some improvements to the existing infrastructure systems serving the site (e.g., roadways, sewer lines, water lines) may be required. Given the relatively minor size of the proposed development (net gain of approximately 69,054 sq. ft. of new commercial, retail and restaurant space), the proposed project is not anticipated to induce substantial direct or indirect population growth within the community of Marina del Rey. There would be less than significant impacts and further analysis on this topic is not warranted.

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **b) Displace substantial numbers of existing housing, especially affordable housing, necessitating the construction of replacement housing elsewhere?** | ☐ | ☐ | ☐ | ☒ |

No residential development is currently present within the project site and none is proposed for development under the proposed project. As no housing would be displaced, no further analysis of this topic is required.

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?** | ☐ | ☐ | ☐ | ☒ |

No residential development is currently present within the project site and none is proposed for development under the proposed project. As no existing residents would be displaced, no further analysis of this topic is required.

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **d) Cumulatively exceed official regional or local population projections?** | ☐ | ☐ | ☐ | ☒ |

The proposed project is the redevelopment of an existing commercial and boat storage complex. No residential land use component is proposed. Therefore, implementation of the proposed project would not exceed official regional or local population projections and there would be no impacts. Additional analysis on this topic is not required.

## 15. PUBLIC SERVICES

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Would the project create capacity or service level problems, or result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:** | | | | |
| **Fire protection?** | ☒ | ☐ | ☐ | ☐ |

The project site is located in the urbanized area of Marina del Rey. Best Management Practices (BMPs) would be standard during demolition and construction of the commercial buildings to ensure that the threat for fire and the threat of crime (pilferage of the construction equipment) is reduced or does not occur on the project site. The proposed project would not result in population growth, and therefore is not expected to substantially affect the ability of existing fire protection resources to meet established standards for service levels. The nearest County Fire Station (#110), located at 4433 Admiralty Way, to the project site is 0.4 mile away. This topic will be further analyzed in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **Sheriff protection?** | ☒ | ☐ | ☐ | ☐ |

As discussed under **threshold 15a**, above, the proposed project would not result in population growth, and therefore is not expected to substantially affect the ability of existing sheriff protection resources to meet established standards for service levels. The nearest County Sheriff's Station, located at 13851 Fiji Way, to the project site is 1.0 mile away. However, further analysis of this issue will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **Schools?** | ☐ | ☐ | ☐ | ☒ |

As discussed under **threshold 15a**, above, the proposed project would not result in population growth, and therefore would not substantially affect the ability of existing schools to meet established standards for service levels. No further analysis of this issue is required.

| | | | | |
|---|---|---|---|---|
| **Parks?** | ☐ | ☐ | ☐ | ☒ |

As discussed under **threshold 15a**, above, the proposed project would not result in population growth, and therefore is not expected to substantially affect the ability of existing recreational facilities to meet established standards for service levels. No further analysis of this issue is required.

| | | | | |
|---|---|---|---|---|
| **Libraries?** | ☐ | ☐ | ☐ | ☒ |

As discussed under **threshold 15a**, above, the proposed project would not result in population growth, and therefore would not substantially affect the ability of existing library resources to meet established standards for service levels. No further analysis of this issue is required.

**Other public facilities?** ☐ ☐ ☐ ☒

There are no other public services in the project area that would be impacted by the proposed project.

## 16. RECREATION

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?** | ☐ | ☐ | ☒ | ☐ |

The existing commercial structures do not currently include recreational features for visitors. The Marvin Braude Bike Path, a Class I facility, currently meanders through existing surface parking areas on the project site southwest of Admiralty Way. As discussed above, the project will relocate this bike path along the Admiralty Way-fronting bulkhead, which will be a significant improvement to the existing condition by providing a straight alignment for the bike path along the waterfront. The project also includes development of an expansive public pedestrian promenade along the parcel's bulkhead, whereas the existing developed parcel lacks such a recreational amenity. Further, the proposed project will include recreational amenities associated with the bike path, including bicycle parking. As discussed under **threshold 15a**, above, the proposed project would not result in population increases and is thus not expected to increase the use of existing recreational resources. No further analysis of this issue is required.

| | | | | |
|---|---|---|---|---|
| **b) Does the project include neighborhood and regional parks or other recreational facilities or require the construction or expansion of such facilities which might have an adverse physical effect on the environment?** | ☐ | ☐ | ☒ | ☐ |

The proposed project does not include the development of any neighborhood or regional park facilities. As discussed above under threshold 16a above, the project includes improvements to the existing bike path. These improvements are limited to the relocation of the existing bike path and would not result in an adverse effect on the environment. Therefore, impacts would be less than significant and further analysis on this topic area is not required.

**c) Would the project interfere with regional open space connectivity?** ☐ ☐ ☒ ☐

The Marvin Braude Bike Path, a Class I facility, crosses the project site southwest of Admiralty Way. However, as discussed under threshold 16a, the improvements would generally be limited to the area between Admiralty Way and the bike path. The bike path would be maintained on-site; however, the path's alignment on the site would be substantially improved as the bike path would be realigned in a straight line through the site and would no longer meander through the parking lot, thereby improving safety. Further, the proposed project includes bicycle parking and pedestrian amenities that would encourage and enhance public use of the subject property. Therefore the proposed project would not interfere with regional open space connectivity, but, rather, would improve such connectivity; impacts would be less than significant an additional analysis of this impact area is not warranted.

## 17. TRANSPORTATION/TRAFFIC

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?** | ☒ | ☐ | ☐ | ☐ |

The proposed project site is currently served by the Los Angeles County Metropolitan Transportation Authority (Metro) and Culver Citybus that provides alternative transportation throughout the community of Marina del Rey and into parts of the Los Angeles Metro Region. Redevelopment of the existing commercial structures and surface parking and storage areas would not interfere with alternative transportation service as provided by Metro and Culver Citybus. Since implementation of the proposed project would not conflict with adopted policies, plans, or programs supporting alternative transportation, there would be no impact. However, a comprehensive traffic study will be prepared to assess the project's impacts on the local and sub-regional transportation circulation systems, identify potential significant impacts to these systems, and assign traffic system improvements intended to mitigate the project's significant transportation circulation impacts, if any, to the extent feasible. As such, additional analysis on this topic will be provided in the Project EIR.

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **b) Conflict with an applicable congestion management program (CMP), including, but not limited to, level of service standards and travel demand measures, or other standards established by the CMP for designated roads or highways?** | ☒ | ☐ | ☐ | ☐ |

The CMP requires that detailed analyses be conducted for any arterial monitoring intersections where the proposed project is anticipated to add 50 or more total trips, or for freeway mainline segments where the proposed project is anticipated to add 150 or more trips (per direction) during either the weekday AM or PM peak hours. The current CMP (2010) identifies eight arterial monitoring intersections within approximately 3 miles of the project site. Six of the eight CMP intersections are located within the City of Los Angeles, while one intersection is located within the City of Santa Monica and the remaining intersection is located within the City of Culver City. The CMP arterial monitoring locations are listed below.

- Lincoln Boulevard and Venice Boulevard (Los Angeles)

- Lincoln Boulevard and the Marina Expressway (SR-90) (Los Angeles)
- Lincoln Boulevard and Manchester Avenue (Los Angeles)
- Lincoln Boulevard and Sepulveda Boulevard (Los Angeles)
- Lincoln Boulevard and Pico Boulevard (Santa Monica)
- Venice Boulevard and Centinela Avenue (Los Angeles)
- Venice Boulevard and Overland Avenue (Culver City)
- Manchester Avenue and Sepulveda Boulevard (Los Angeles)

Additionally, the CMP identifies the I-405 (San Diego) Freeway in the project vicinity (specifically between La Tijera Boulevard and the I-10 (Santa Monica) Freeway) as a monitored facility. A complete list of study intersections for detailed analyses of project impacts, including, but not limited to the CMP arterial monitoring locations noted above, will be determined through consultation with the Los Angeles County Department of Public Works, Traffic & Lighting Division. A review of the project's anticipated traffic travel patterns into, out of, and through the study vicinity indicates that project traffic will disperse throughout the area roadway network outside the immediate study vicinity, and that project traffic volume additions to any of the CMP monitoring intersections are expected to be substantially less than the 50-trip threshold and that project-related traffic additions to the subject freeway mainline segments will also be less than the 150-trip threshold. However, additional analysis on this topic will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?** | ☐ | ☐ | ☐ | ☒ |

The proposed project would not change any air traffic patterns and there would be no impact.

| | | | | |
|---|---|---|---|---|
| **d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?** | ☒ | ☐ | ☐ | ☐ |

A comprehensive traffic study will be prepared to assess the project's impacts on the roadways and road intersections in the vicinity of the project site, identify potential significant impacts to these roadways and road intersections, and assign roadway and intersection improvements intended to mitigate the project's significant impacts to analyzed roadways and road intersections, if any, to the extent feasible. Additional analysis on this topic will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **e) Result in inadequate emergency access?** | ☒ | ☐ | ☐ | ☐ |

The proposed project is not anticipated to create a significant impact to emergency access, either on-site or off-site; however, additional analysis on this topic will be provided in the Project EIR.

**f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?**

| ☐ | ☐ | ☒ | ☐ |
|---|---|---|---|

The proposed project will not interfere with existing Bikeway Plan, Pedestrian Plan, Transit Oriented District development standards in the County General Plan Mobility Element. As noted above, the Marvin Braude Bike Path, a Class I facility, currently meanders through existing surface parking areas on the project site southwest of Admiralty Way. The project will relocate this bike path along the Admiralty Way-fronting bulkhead, which will be a significant improvement to the existing condition by providing a straight alignment for the bike path along the waterfront. The proposed project also includes bicycle parking. Therefore, project impacts will be less than significant.

## 18. UTILITIES AND SERVICE SYSTEMS

| Would the project: | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Exceed wastewater treatment requirements of either the Los Angeles or Lahontan Regional Water Quality Control Boards?** | ☒ | ☐ | ☐ | ☐ |

The increased development intensity within the project site as a result of the proposed project would increase the amount of wastewater discharged from the site using existing wastewater conveyance lines and treatment facilities. Additional study of the potential for the project to exceed wastewater treatment requirements will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **b) Create water or wastewater system capacity problems, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?** | ☒ | ☐ | ☐ | ☐ |

The increased development intensity within the project site as a result of the proposed project would increase the amount of wastewater discharged from the site using existing wastewater conveyance lines and treatment facilities. Additional study of the potential for the project to exceed wastewater treatment capacity will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **c) Create drainage system capacity problems, or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?** | ☒ | ☐ | ☐ | ☐ |

The project is currently covered with impermeable surfaces such as commercial structures and paved parking lots. Project compliance with County requirements for LID design features (see discussion under **threshold 10d**, above) is expected to result in an increase of permeable surfaces within the project site, reducing the amount of stormwater exiting the site. This topic will be further analyzed in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **d) Have sufficient reliable water supplies available to serve the project demands from existing entitlements and resources, considering existing and projected water demands from other land uses?** | ☒ | ☐ | ☐ | ☐ |

The project site is located in a developed area of Marina del Rey that is currently served by an existing water conveyance system. The increased commercial density proposed for the project site would result in an increase in water demand at project buildout. Additional study of this topic is warranted and will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **e) Create energy utility (electricity, natural gas, propane) system capacity problems, or result in the construction of new energy facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?** | ☒ | ☐ | ☐ | ☐ |

The project site currently receives electricity from the Southern California Edison Company and natural gas from the Southern California Gas Company. Infrastructure currently exists on the project site, which conveys an adequate supply of electricity and natural gas to the existing uses on the project site. Project development will result in an increase of building square footage and therefore the proposed project would demand more electricity and natural gas that is currently being demanded under existing conditions. Further analysis on this topic will be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?** | ☒ | ☐ | ☐ | ☐ |

During project demolition, construction, and redevelopment activities, an increase in the amount of construction debris would occur; however, this increase would be temporary in nature and would be able to be accommodated by the local solid waste disposal service provided in the community of Marina del Rey. Furthermore, any debris that would be generated by the proposed project would be subject to the required diversion rate. Operation of the proposed project could result in a potential impact to solid waste disposal facilities, and further analysis of this issue will therefore be provided in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **g) Comply with federal, state, and local statutes and regulations related to solid waste?** | ☐ | ☐ | ☒ | ☐ |

The proposed project would comply with all federal, state, and local statutes regulating solid waste. While the proposed project would result in an increase in solid waste disposal, the proposed project would comply with solid waste diversion programs for construction and operational solid waste. No further analysis of this issue is required.

## 19. MANDATORY FINDINGS OF SIGNIFICANCE

| | Potentially Significant Impact | Less Than Significant Impact with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?** | ☒ | ☐ | ☐ | ☐ |

Based on the findings of this initial study, the proposed project is not expected to eliminate important examples of the major periods of California prehistory. The proposed project would not substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, nor threaten a plant or animal community. Some potential exists for the proposed project to impact nesting birds such as the Great Blue Heron, Black-crowned Night Heron, Double-crested Cormorant, and Great Egret, to the extent these species might happen to establish nests on the site. These topic areas will be further evaluated in the Project EIR.

| | | | | |
|---|---|---|---|---|
| **b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?** | ☐ | ☐ | ☒ | ☐ |

The proposed project would not disadvantage any long-term environmental goals of Los Angeles County or those identified in the Marina del Rey 2010 Conservation and Management Plan in an effort to achieve short-term environmental goals, as both goals are consistent with each other. Moreover, by incorporating state-of-the-industry water quality protection measures and Green Building standards (as will be required for the project under the County's applicable Low-Impact Development and Green Building ordinances), the project's short-term environmental protection and sustainability components will help to fulfill the County's longer-term environmental protection and sustainability goals.

**c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?**

☒ ☐ ☐ ☐

As described throughout this Initial Study, the proposed project would increase the current land use intensity on the project site. Related projects as specified above would be involved in individual environmental review to determine the level of significance for impacts pertaining to each of their individual development. Therefore, cumulative impacts could be significant and the project's contribution to cumulative impacts would be cumulatively considerable. Cumulative project impacts will be analyzed in the EIR.

**d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?**

☒ ☐ ☐ ☐

As described throughout this Initial Study, the proposed project includes the redevelopment of the existing commercial and marine-related facilities and the associated surface parking lot on the project site. The proposed project is not anticipated to include construction or operational activities that would cause a substantial adverse effect on human beings. However, the Project EIR will provide additional analysis on various environmental impact areas identified for further study in this Initial Study, to confirm whether any such impacts will cause substantial adverse effects on human beings, either directly or indirectly.

# DEPARTMENT OF CONSERVATION

OIL, GAS & GEOTHERMAL

DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES

5816 Corporate Avenue • Suite 200 • CYPRESS, CALIFORNIA, 90630-4731

PHONE 714 / 816-6847 • FAX 714 / 816-6853 • WEBSITE conservation.ca.gov

September 3, 2013

RECEIVED
SEP 09 2013
BY:

Ms. Anita Gutierrez, AICP
County of Los Angeles
Department of Regional Planning
320 Temple Street
Los Angeles, CA 90012

Dear Ms. Gutierrez:

NOTICE OF PREPARATION AND NOTICE OF SCOPING MEETING FOR PARCEL 44 (PROJECT NUMBER R2013-01647), MARINA DEL REY, LOS ANGELES COUNTY, CA – SCH# 2013081040

The Department of Conservation's Division of Oil, Gas, and Geothermal Resources (Division), Cypress office, has reviewed the above referenced project. Our comments are as follows.

Your proposed project is located within the administrative boundaries of the Playa del Rey oil field and Los Angeles County. The closest well to your project is well "Ohio D.R.L. & W." 2 (037-13801), mapped approximately 800 feet southwest of the project boundary. This well is located on Division map 120 and in Division records.

The Division is mandated by Section 3106 of the Public Resources Code (PRC) to supervise the drilling, operation, maintenance, and plugging and abandonment of wells for the purpose of preventing: (1) damage to life, health, property, and natural resources; (2) damage to underground and surface waters suitable for irrigation or domestic use; (3) loss of oil, gas, or reservoir energy; and (4) damage to oil and gas deposits by infiltrating water and other causes. Furthermore, the PRC vests in the State Oil and Gas Supervisor (Supervisor) the authority to regulate the manner of drilling, operation, maintenance, and abandonment of oil and gas wells so as to conserve, protect, and prevent waste of these resources, while at the same time encouraging operators to apply viable methods for the purpose of increasing the ultimate recovery of oil and gas.

The scope and content of information that is germane to the Division's responsibility are contained in Section 3000 et seq. of the Public Resources Code (PRC), and administrative regulations under Title 14, Division 2, Chapter 4 of the California Code of Regulations.

If any structure is to be located over or in the proximity of a previously plugged and abandoned well, the well may need to be plugged to current Division specifications. Section 3208.1 of the Public Resources Code (PRC) authorizes the State Oil and Gas Supervisor (Supervisor) to order the reabandonment of any previously plugged and abandoned well when construction of any structure over or in the proximity of the well could result in a hazard.

An operator must have a bond on file with the Division before certain well operations are allowed to begin. The purpose of the bond is to secure the state against all losses, charges, and expenses incurred by it to obtain such compliance by the principal named in the bond. The operator must also designate an agent, residing in the state, to receive and accept service of all orders, notices, and processes of the Supervisor or any court of law.

Written approval from the Supervisor is required prior to changing the physical condition of any well. The operator's notice of intent (notice) to perform any well operation is reviewed on engineering and geological basis. For new wells and the altering of existing wells, approval of the proposal depends primarily on the following: protecting all subsurface hydrocarbons and fresh waters; protection of the environment; using adequate blowout prevention equipment; and utilizing approved drilling and cementing techniques.

The Division must be notified to witness or inspect all operations specified in the approval of any notice. This includes tests and inspections of blowout-prevention equipment, reservoir and freshwater protection measures, and well-plugging operations.

The Division recommends that adequate safety measures be taken by the project manager to prevent people from gaining unauthorized access to oilfield equipment. Safety shut-down devices on wells and other oilfield equipment must be considered when appropriate.

If any plugged and abandoned or unrecorded wells are damaged or uncovered during excavation or grading, remedial plugging operations may be required. If such damage or discovery occurs, the Division's Cypress district office must be contacted to obtain information on the requirements for and approval to perform remedial operations.

Sincerely,

Kathleen M. Andrews

Kathleen M. Andrews
Associate Oil & Gas Engineer - Facilities

Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

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Metro

RECEIVED
SEP 16 2013
BY:

September 13, 2013

Anita Gutierrez, AICP
County of Los Angeles
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

**RE: Parcel 44- Notice of Preparation – Environmental Impact Report**

Dear Ms. Gutierrez:

The Los Angeles County Metropolitan Transportation Authority (LACMTA) is in receipt of the Notice of Preparation (NOP) of the Environmental Impact Report (EIR) for the proposed Parcel 44 development project at the intersection of Admiralty Way and Bali Way in Marina del Rey (Project Number R2013-01647, Environmental Review No. 201300142). This letter conveys comments concerning issues that are germane to LACMTA's statutory responsibilities in relation to the proposed project as well as issues that may impact LACMTA's operations and facilities.

Metro bus lines operate on Admiralty Way, adjacent to the proposed project. One Metro bus stop on the corner of Admiralty Way and Bali Way is directly adjacent to the proposed project. The following comments relate to bus operations and the bus stop:

1. Although the project is not expected to result in any long-term impacts on transit, the developer should be aware of the bus facilities and services that are present. The existing Metro bus stop must be maintained as part of the final project.

2. During construction, the stops must be maintained or relocated consistent with the needs of Metro Bus Operations. Metro Bus Operations Control Special Events Coordinator should be contacted at 213-922-4632 regarding construction activities that may Impact Metro bus lines. Other municipal bus service operators, notably Culver City Bus and LADOT Commuter Express, may also be impacted and should be included in construction outreach efforts.

3. LACMTA encourages the installation of bus shelters, benches and other amenities that improve the transit rider experience. The County should consider requesting the installation of such amenities as part of the redevelopment of the site.

4. Final design of the bus stop and surrounding sidewalk area must be Americans with Disabilities Act (ADA) compliant and allow passengers with disabilities a clear path of travel to the bus stop from the proposed development.

The Marvin Braude Bike Path that runs through the project site provides bicycle access to the proposed project and connects with the South Bay Bike Trail and the Ballona Creek

Trail, both major bicycle facilities in the region. In their interest of supporting all modes of transportation and minimizing congestion across the County, LACMTA commends the realignment of the bicycle path along the waterfront in the proposed project. LACMTA would also like to provide the following comments related to bicycle facilities:

1. The design of the proposed bike path should meet the standards in the Caltrans Highway Design Manual (HDM) and California Manual on Uniform Traffic Control Devices (MUTCD).

2. During construction, the applicant should provide adequate detours for bicycles and pedestrians including proper signage and safe alternative routing.

3. LACMTA recommends that the project include secure long term and short term bicycle parking to meet the needs of the project users and integrate with the adjacent bike path.

Beyond impacts to Metro facilities and operations, LACMTA must also notify the applicant of state requirements. A Transportation Impact Analysis (TIA), with roadway and transit components, is required under the State of California Congestion Management Program (CMP) statute. The CMP TIA Guidelines are published in the "2010 Congestion Management Program for Los Angeles County", Appendix D (attached). The geographic area examined in the TIA must include the following, at a minimum:

1. All CMP arterial monitoring intersections, including monitored freeway on/off-ramp intersections, where the proposed project will add 50 or more trips during either the a.m. or p.m. weekday peak hour (of adjacent street traffic).

2. If CMP arterial segments are being analyzed rather than intersections, the study area must include all segments where the proposed project will add 50 or more peak hour trips (total of both directions). Within the study area, the TIA must analyze at least one segment between monitored CMP intersections.

3. Mainline freeway-monitoring locations where the project will add 150 or more trips, in either direction, during either the a.m. or p.m. weekday peak hour.

4. Caltrans must also be consulted through the NOP process to identify other specific locations to be analyzed on the state highway system.

The CMP TIA requirement also contains two separate impact studies covering roadways and transit, as outlined in Sections D.8.1 – D.9.4. If the TIA identifies no facilities for study based on the criteria above, no further traffic analysis is required. However, projects must still consider transit impacts. For all CMP TIA requirements please see the attached guidelines.

If you have any questions regarding this response, please contact Marie Sullivan at 213-922-5667 or by email at sullivanma@metro.net.

Sincerely,

Nick Saponara
Development Review Manager, Countywide Planning

Attachment: CMP Appendix D: Guidelines for CMP Transportation Impact Analysis

APPENDIX

D

# GUIDELINES FOR CMP TRANSPORTATION IMPACT ANALYSIS

*Important Notice to User: This section provides detailed travel statistics for the Los Angeles area which will be updated on an ongoing basis. Updates will be distributed to all local jurisdictions when available. In order to ensure that impact analyses reflect the best available information, lead agencies may also contact MTA at the time of study initiation. Please contact MTA staff to request the most recent release of "Baseline Travel Data for CMP TIAs."*

## D.1 OBJECTIVE OF GUIDELINES

The following guidelines are intended to assist local agencies in evaluating impacts of land use decisions on the Congestion Management Program (CMP) system, through preparation of a regional transportation impact analysis (TIA). The following are the basic objectives of these guidelines:

- Promote consistency in the studies conducted by different jurisdictions, while maintaining flexibility for the variety of project types which could be affected by these guidelines.
- Establish procedures which can be implemented within existing project review processes and without ongoing review by MTA.
- Provide guidelines which can be implemented immediately, with the full intention of subsequent review and possible revision.

These guidelines are based on specific requirements of the Congestion Management Program, and travel data sources available specifically for Los Angeles County. References are listed in Section D.10 which provide additional information on possible methodologies and available resources for conducting TIAs.

## D.2 GENERAL PROVISIONS

Exhibit D-7 provides the model resolution that local jurisdictions adopted containing CMP TIA procedures in 1993. TIA requirements should be fulfilled within the existing environmental review process, extending local traffic impact studies to include impacts to the regional system. In order to monitor activities affected by these requirements, Notices of Preparation (NOPs) must be submitted to MTA as a responsible agency. Formal MTA approval of individual TIAs is not required.

The following sections describe CMP TIA requirements in detail. In general, the competing objectives of consistency & flexibility have been addressed by specifying standard, or minimum, requirements and requiring documentation when a TIA varies from these standards.

## D.3 PROJECTS SUBJECT TO ANALYSIS

In general a CMP TIA is required for all projects required to prepare an Environmental Impact Report (EIR) based on local determination. A TIA is not required if the lead agency for the EIR finds that traffic is not a significant issue, and does not require local or regional traffic impact analysis in the EIR. Please refer to Chapter 5 for more detailed information.

CMP TIA guidelines, particularly intersection analyses, are largely geared toward analysis of projects where land use types and design details are known. Where likely land uses are not defined (such as where project descriptions are limited to zoning designation and parcel size with no information on access location), the level of detail in the TIA may be adjusted accordingly. This may apply, for example, to some redevelopment areas and citywide general plans, or community level specific plans. In such cases, where project definition is insufficient for meaningful intersection level of service analysis, CMP arterial segment analysis may substitute for intersection analysis.

## D.4 STUDY AREA

The geographic area examined in the TIA must include the following, at a minimum:

- All CMP arterial monitoring intersections, including monitored freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic).
- If CMP arterial segments are being analyzed rather than intersections (see Section D.3), the study area must include all segments where the proposed project will add 50 or more peak hour trips (total of both directions). Within the study area, the TIA must analyze at least one segment between monitored CMP intersections.
- Mainline freeway monitoring locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.
- Caltrans must also be consulted through the Notice of Preparation (NOP) process to identify other specific locations to be analyzed on the state highway system.

**If the TIA identifies no facilities for study based on these criteria, no further traffic analysis is required. However, projects must still consider transit impacts (Section D.8.4).**

## D.5 BACKGROUND TRAFFIC CONDITIONS

The following sections describe the procedures for documenting and estimating background, or non-project related traffic conditions. Note that for the purpose of a TIA, these background estimates must include traffic from all sources without regard to the exemptions specified in CMP statute (e.g., traffic generated by the provision of low and very low income housing, or trips originating outside Los Angeles County. Refer to Chapter 5, Section 5.2.3 for a complete list of exempted projects).

D.5.1 **Existing Traffic Conditions.** Existing traffic volumes and levels of service (LOS) on the CMP highway system within the study area must be documented. Traffic counts must be less than one year old at the time the study is initiated, and collected in accordance with CMP highway monitoring requirements (see Appendix A). Section D.8.1 describes TIA LOS calculation requirements in greater detail. Freeway traffic volume and LOS data provided by Caltrans is also provided in Appendix A.

**D.5.2 Selection of Horizon Year and Background Traffic Growth.** Horizon year(s) selection is left to the lead agency, based on individual characteristics of the project being analyzed. In general, the horizon year should reflect a realistic estimate of the project completion date. For large developments phased over several years, review of intermediate milestones prior to buildout should also be considered.

At a minimum, horizon year background traffic growth estimates must use the generalized growth factors shown in Exhibit D-1. These growth factors are based on regional modeling efforts, and estimate the general effect of cumulative development and other socioeconomic changes on traffic throughout the region. Beyond this minimum, selection among the various methodologies available to estimate horizon year background traffic in greater detail is left to the lead agency. Suggested approaches include consultation with the jurisdiction in which the intersection under study is located, in order to obtain more detailed traffic estimates based on ongoing development in the vicinity.

## D.6 PROPOSED PROJECT TRAFFIC GENERATION

Traffic generation estimates must conform to the procedures of the current edition of Trip Generation, by the Institute of Transportation Engineers (ITE). If an alternative methodology is used, the basis for this methodology must be fully documented.

Increases in site traffic generation may be reduced for existing land uses to be removed, if the existing use was operating during the year the traffic counts were collected. Current traffic generation should be substantiated by actual driveway counts; however, if infeasible, traffic may be estimated based on a methodology consistent with that used for the proposed use.

Regional transportation impact analysis also requires consideration of trip lengths. Total site traffic generation must therefore be divided into work and non-work-related trip purposes in order to reflect observed trip length differences. Exhibit D-2 provides factors which indicate trip purpose breakdowns for various land use types.

For lead agencies who also participate in CMP highway monitoring, it is recommended that any traffic counts on CMP facilities needed to prepare the TIA should be done in the manner outlined in Chapter 2 and Appendix A. If the TIA traffic counts are taken within one year of the deadline for submittal of CMP highway monitoring data, the local jurisdiction would save the cost of having to conduct the traffic counts twice.

## D.7 TRIP DISTRIBUTION

For trip distribution by direct/manual assignment, generalized trip distribution factors are provided in Exhibit D-3, based on regional modeling efforts. These factors indicate Regional Statistical Area (RSA)-level tripmaking for work and non-work trip purposes.

(These RSAs are illustrated in Exhibit D-4.) For locations where it is difficult to determine the project site RSA, census tract/RSA correspondence tables are available from MTA.

Exhibit D-5 describes a general approach to applying the preceding factors. Project trip distribution must be consistent with these trip distribution and purpose factors; the basis for variation must be documented.

Local agency travel demand models disaggregated from the SCAG regional model are presumed to conform to this requirement, as long as the trip distribution functions are consistent with the regional distribution patterns. For retail commercial developments, alternative trip distribution factors may be appropriate based on the market area for the specific planned use. Such market area analysis must clearly identify the basis for the trip distribution pattern expected.

## D.8 IMPACT ANALYSIS

CMP Transportation Impact Analyses contain two separate impact studies covering roadways and transit. Section Nos. D.8.1-D.8.3 cover required roadway analysis while Section No. D.8.4 covers the required transit impact analysis. Section Nos. D.9.1-D.9.4 define the requirement for discussion and evaluation of alternative mitigation measures.

**D.8.1 Intersection Level of Service Analysis.** The LA County CMP recognizes that individual jurisdictions have wide ranging experience with LOS analysis, reflecting the variety of community characteristics, traffic controls and street standards throughout the county. As a result, the CMP acknowledges the possibility that no single set of assumptions should be mandated for all TIAs within the county.

However, in order to promote consistency in the TIAs prepared by different jurisdictions, CMP TIAs must conduct intersection LOS calculations using either of the following methods:

- The Intersection Capacity Utilization (ICU) method as specified for CMP highway monitoring (see Appendix A); or
- The Critical Movement Analysis (CMA) / Circular 212 method.

Variation from the standard assumptions under either of these methods for circumstances at particular intersections must be fully documented.

TIAs using the 1985 or 1994 Highway Capacity Manual (HCM) operational analysis must provide converted volume-to-capacity based LOS values, as specified for CMP highway monitoring in Appendix A.

**D.8.2 Arterial Segment Analysis.** For TIAs involving arterial segment analysis, volume-to-capacity ratios must be calculated for each segment and LOS values assigned using the V/C-LOS equivalency specified for arterial intersections. A capacity of 800 vehicles per hour per through traffic lane must be used, unless localized conditions necessitate alternative values to approximate current intersection congestion levels.

**D.8.3 Freeway Segment (Mainline) Analysis.** For the purpose of CMP TIAs, a simplified analysis of freeway impacts is required. This analysis consists of a demand-to-capacity calculation for the affected segments, and is indicated in Exhibit D-6.

**D.8.4 Transit Impact Review.** CMP transit analysis requirements are met by completing and incorporating into an EIR the following transit impact analysis:

- ☐ Evidence that affected transit operators received the Notice of Preparation.
- ☐ A summary of existing transit services in the project area. Include local fixed-route services within a ¼ mile radius of the project; express bus routes within a 2 mile radius of the project, and; rail service within a 2 mile radius of the project.
- ☐ Information on trip generation and mode assignment for both AM and PM peak hour periods as well as for daily periods. Trips assigned to transit will also need to be calculated for the same peak hour and daily periods. Peak hours are defined as 7:30-8:30 AM and 4:30-5:30 PM. Both "peak hour" and "daily" refer to average weekdays, unless special seasonal variations are expected. If expected, seasonal variations should be described.
- ☐ Documentation of the assumption and analyses that were used to determine the number and percent of trips assigned to transit. Trips assigned to transit may be calculated along the following guidelines:
  - ➢ Multiply the total trips generated by 1.4 to convert vehicle trips to person trips;
  - ➢ For each time period, multiply the result by one of the following factors:

    3.5% of Total Person Trips Generated for most cases, except:

    10% primarily Residential within 1/4 mile of a CMP transit center
    15% primarily Commercial within 1/4 mile of a CMP transit center
    7% primarily Residential within 1/4 mile of a CMP multi-modal transportation center
    9% primarily Commercial within 1/4 mile of a CMP multi-modal transportation center
    5% primarily Residential within 1/4 mile of a CMP transit corridor
    7% primarily Commercial within 1/4 mile of a CMP transit corridor
    0% if no fixed route transit services operate within one mile of the project

  To determine whether a project is primarily residential or commercial in nature, please refer to the CMP land use categories listed and defined in Appendix E, *Guidelines for New Development Activity Tracking and Self Certification.* For projects that are only partially within the above one-quarter mile radius, the base rate (3.5% of total trips generated) should be applied to all of the project buildings that touch the radius perimeter.
- ☐ Information on facilities and/or programs that will be incorporated in the development plan that will encourage public transit use. Include not only the jurisdiction's TDM Ordinance measures, but other project specific measures.

- Analysis of expected project impacts on current and future transit services and proposed project mitigation measures, and;
- Selection of final mitigation measures remains at the discretion of the local jurisdiction/lead agency. Once a mitigation program is selected, the jurisdiction self-monitors implementation through the existing mitigation monitoring requirements of CEQA.

## D.9 IDENTIFICATION AND EVALUATION OF MITIGATION

**D.9.1 Criteria for Determining a Significant Impact.** For purposes of the CMP, a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity ($V/C \geq 0.02$), causing LOS F ($V/C > 1.00$); if the facility is already at LOS F, a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity ($V/C \geq 0.02$). The lead agency may apply a more stringent criteria if desired.

**D.9.2 Identification of Mitigation.** Once the project has been determined to cause a significant impact, the lead agency must investigate measures which will mitigate the impact of the project. Mitigation measures proposed must clearly indicate the following:

- Cost estimates, indicating the fair share costs to mitigate the impact of the proposed project. If the improvement from a proposed mitigation measure will exceed the impact of the project, the TIA must indicate the proportion of total mitigation costs which is attributable to the project. This fulfills the statutory requirement to exclude the costs of mitigating inter-regional trips.
- Implementation responsibilities. Where the agency responsible for implementing mitigation is not the lead agency, the TIA must document consultation with the implementing agency regarding project impacts, mitigation feasibility and responsibility.

Final selection of mitigation measures remains at the discretion of the lead agency. The TIA must, however, provide a summary of impacts and mitigation measures. Once a mitigation program is selected, the jurisdiction self-monitors implementation through the mitigation monitoring requirements contained in CEQA.

**D.9.3 Project Contribution to Planned Regional Improvements.** If the TIA concludes that project impacts will be mitigated by anticipated regional transportation improvements, such as rail transit or high occupancy vehicle facilities, the TIA must document:

- Any project contribution to the improvement, and
- The means by which trips generated at the site will access the regional facility.

**D.9.4 Transportation Demand Management (TDM).** If the TIA concludes or assumes that project impacts will be reduced through the implementation of TDM measures, the TIA must document specific actions to be implemented by the project which substantiate these conclusions.

## D.10 REFERENCES

1. *Traffic Access and Impact Studies for Site Development: A Recommended Practice*, Institute of Transportation Engineers, 1991.

2. *Trip Generation*, 5th Edition, Institute of Transportation Engineers, 1991.

3. *Travel Forecast Summary: 1987 Base Model - Los Angeles Regional Transportation Study (LARTS)*, California State Department of Transportation (Caltrans), February 1990.

4. *Traffic Study Guidelines*, City of Los Angeles Department of Transportation (LADOT), July 1991.

5. *Traffic/Access Guidelines*, County of Los Angeles Department of Public Works.

6. *Building Better Communities*, Sourcebook, Coordinating Land Use and Transit Planning, American Public Transit Association.

7. *Design Guidelines for Bus Facilities*, Orange County Transit District, 2nd Edition, November 1987.

8. *Coordination of Transit and Project Development*, Orange County Transit District, 1988.

9. *Encouraging Public Transportation Through Effective Land Use Actions*, Municipality of Metropolitan Seattle, May 1987.

# CITY OF LOS ANGELES

CALIFORNIA



ERIC GARCETTI
MAYOR



WASTEWATER ENGINEERING SERVICES DIV.
2714 MEDIA CENTER DRIVE
LOS ANGELES, CA 90065
FAX: (323) 342-6210
(323) 342-6211

November 14, 2013

File: SC.CE.

Anita Gutierrez, AICP
Department of Regional Planning
COUNTY OF LOS ANGELES
320 Temple Street
Los Angeles, CA 90012

Dear Ms. Gutierrez:

**PARCEL 44 - PROJECT NUMBER R2013-01647 – NOTICE OF PREPARATION EIR**

This is in response to your letter requesting a review of your proposed Marina development of offices, commercial, and boat storage. The Bureau of Sanitation has conducted a preliminary evaluation of the potential impacts to the wastewater and stormwater systems for the proposed project.

**WASTEWATER REQUIREMENT**

The Bureau of Sanitation, Wastewater Engineering Services Division (WESD) is charged with the task of evaluating the local sewer conditions and to determine if available wastewater capacity exists for future developments. The evaluation will determine cumulative sewer impacts and guide the planning process for any future sewer improvements projects needed to provide future capacity as the City grows and develops.

**Projected Wastewater Discharges for the Proposed Project:**

| Type Description | Average Daily Flow per Type Description (GPD/UNIT) | Proposed No. of Units | Average Daily Flow (GPD) |
|---|---|---|---|
| ***Proposed*** | | | |
| Grocery Market | 50 GPD/1000 SQ.FT | 13,625 SQ.FT | 681 |
| Retail | 25 GPD/1000 SQ.FT | 38,530 SQ.FT | 963 |
| Offices | 120 GPD/1000 SQ.FT | 16,588 SQ.FT | 1,991 |
| Laundry | 50 GPD/1000 SQ.FT | 542 SQ.FT | 27 |
| Boaters' Lounge | 50 GPD/1000 SQ.FT | 840 SQ.FT | 42 |
| Restaurant | 300 GPD/1000 SQ.FT | 10,645 SQ.FT | 3,194 |
| Yacht Club | 120 GPD/1000 SQ.FT | 1,150 SQ.FT | 138 |
| Boat Repair Shop | 25 GPD/1000 SQ.FT | 700 SQ.FT | 18 |
| **Total** | | | **7,053** |

SEWER AVAILABILITY

The sewer infrastructure in the vicinity of the proposed project includes two existing sewer systems. The first sewer system includes an existing 10-inch line on S Ease N/O Admiralty Way. Sewage from the existing 10-inch line splits into a 21-inch line on Oxford Ave and 30-inch line on Washington Blvd before joining and discharging into a 42-inch line on Washington Blvd. The second sewer system includes an existing 8-inch line on Mindanao Way and an existing 8-inch line on Marina Fwy R/W. Sewage from both existing lines join and feed into a 21-inch line on Marina Fwy before discharging into a 42-inch line on Jefferson Blvd. Figure 1 shows the details of the sewer system within the vicinity of the project.

The current approximate flow level (d/D) and the design capacities at d/D of 50% in the sewer system are as follows:

| Pipe Diameter (in) | Pipe Location | Current Gauging d/D (%) | 50% Design Capacity |
|---|---|---|---|
| 10 | S Ease N/O Admiralty Way | * | 436,084 GPD |
| 21 | Oxford Ave | 50 | 1.65 MGD |
| 30 | Washington Blvd | 33 | 4.92 MGD |
| 42 | Washington Blvd | 57 | 7.39 MGD |
| 8 | Mindanao Way | * | 240,516 GPD |
| 8 | Marina Fwy R/W | * | 240,516 GPD |
| 21 | Marina Fwy | 36 | 1.50 MGD |
| 42 | Jefferson Blvd | 27 | 9.55 MGD |

* No gauging available

Based on the estimated flows, it appears the sewer system might be able to accommodate the total flow for your proposed project. Further detailed gauging and evaluation will be needed as part of the permit process to identify a specific sewer connection point. If the public sewer has insufficient capacity then the developer will be required to build sewer lines to a point in the sewer system with sufficient capacity. A final approval for sewer capacity and connection permit will be made at that time. Ultimately, this sewage flow will be conveyed to the Hyperion Treatment Plant, which has sufficient capacity for the project.

If you have any questions, please call Kwasi Berko of my staff at (323) 342-1562.

**STORMWATER REQUIREMENTS**

The Bureau of Sanitation, Watershed Protection Division (WPD) is charged with the task of ensuring the implementation of the Municipal Stormwater Permit requirements within the City of Los Angeles. We anticipate the following requirements would apply for this project.

POST-CONSTRUCTION MITIGATION REQUIREMENTS

The project requires implementation of stormwater mitigation measures. These requirements are based on the Standard Urban Stormwater Mitigation Plan (SUSMP) and the recently adopted Low Impact Development (LID) requirements. The projects that are subject to SUSMP/LID are required to incorporate measures to mitigate the impact of stormwater runoff. The requirements are outlined in the guidance manual titled"*Development Best Management Practices Handbook – Part B: Planning Activities*". Current regulations prioritize infiltration, capture/use, and then biofiltration as the preferred stormwater control measures. The relevant documents can be found at: www.lastormwater.org. It is advised that input regarding SUSMP requirements be received in the early phases of the project from WPD's plan-checking staff.

GREEN STREETS

The City is developing a Green Street Initiative that will require projects to implement Green Street elements in the parkway areas between the roadway and sidewalk of the public right-of-away to capture and retain stormwater and urban runoff to mitigate the impact of stormwater runoff and other environmental concerns. The goals of the Green Street elements are to improve the water quality of stormwater runoff, recharge local ground water basins, improve air quality, reduce the heat island effect of street pavement, enhance pedestrian use of sidewalks, and encourage alternate means of transportation. The Green Street elements may include infiltration systems, biofiltration swales, and permeable pavements where stormwater can be easily directed from the streets into the parkways and can be implemented in conjunction with the SUSMP/LID requirements.

CONSTRUCTION REQUIREMENTS

The project is required to implement stormwater control measures during its construction phase. All projects are subject to a set of minimum control measures to lessen the impact of stormwater pollution. In addition for projects that involve construction during the rainy season that is between October 1 and April 15, a Wet Weather Erosion Control Plan is required to be prepared. Also projects that disturb more than one-acre of land are subject to the California General Construction Stormwater Permit. As part of this requirement a Notice of Intent (NOI) needs to be filed with the State of California and a Storm Water Pollution Prevention Plan (SWPPP) needs to be prepared. The SWPPP must be maintained on-site during the duration of construction.

If there are questions regarding the stormwater requirements, please call Kosta Kaporis at (213) 485-0586, or WPD's plan-checking counter at (213) 482-7066. WPD's plan-checking counter can also be visited at 201 N. Figueroa, 3rd Fl, Station 18.

**SOLID RESOURCE REQUIREMENTS**

The City has a standard requirement that applies to all proposed residential developments of four or more units or where the addition of floor areas is 25 percent or more, and all other development projects where the addition of floor area is 30 percent or more. Such developments must set aside a recycling area or room for onsite recycling activities. For more details of this requirement, please contact Daniel Hackney of the Special Project Division at (213)485-3684.

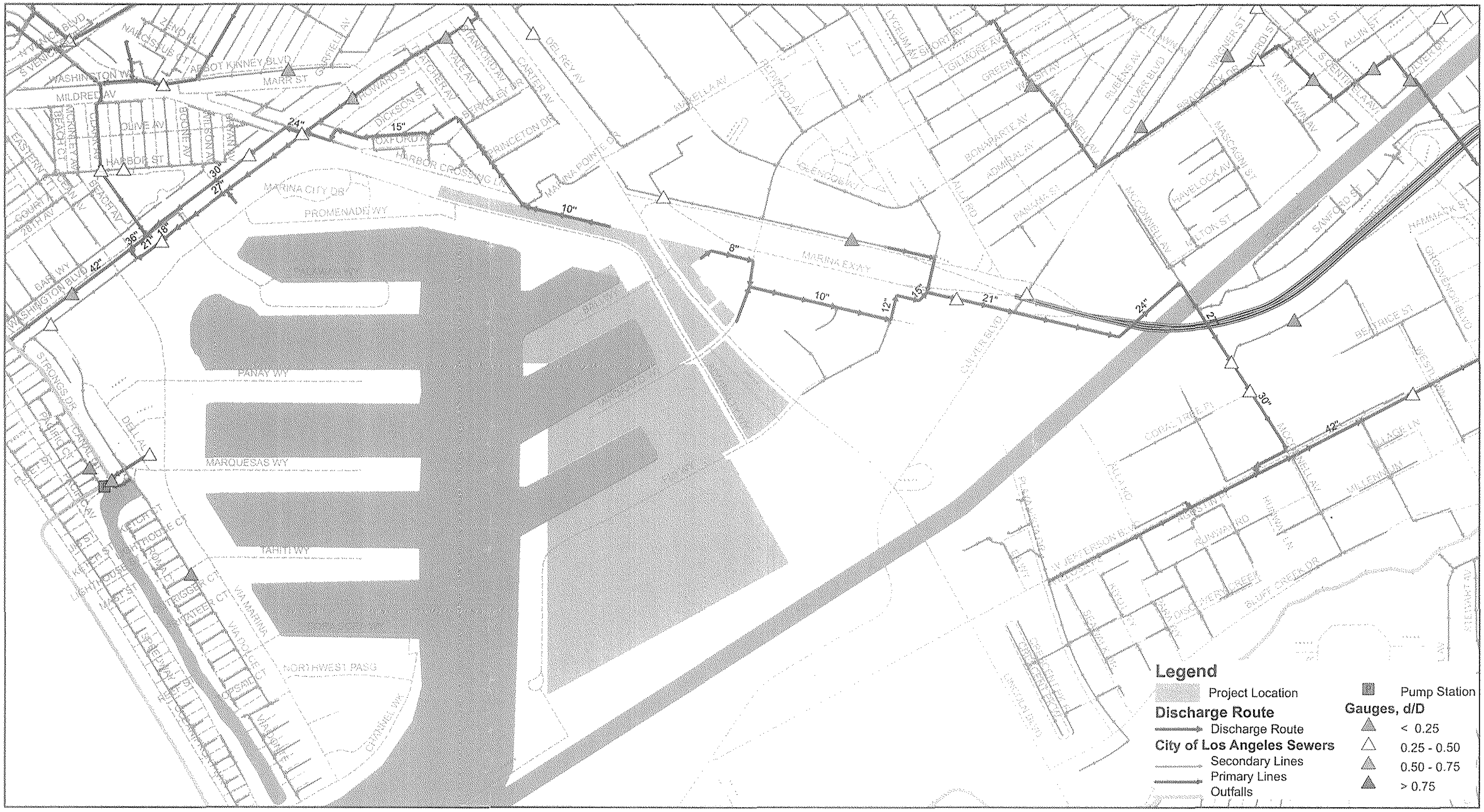
Sincerely,

Ali Poosti, Division Manager
Wastewater Engineering Services Division
Bureau of Sanitation

KB\AP:tn

Attachment: Figure 1 – Sewer Map

c: Kosta Kaporis, BOS
Daniel Hackney, BOS
Zemamu Gebrewold, BOS




Wastewater Engineering Services Division
Bureau of Sanitation
City of Los Angeles

CITY OF LOS ANGELES
SANITATION
DEPARTMENT OF
PUBLIC WORKS

Thomas Brother Data reproduced with permission granted by THOMAS BROS MAP

# FIGURE 1
## Parcel 44 - Project Number R2013-01647
## Sewer Map

0 590 1,180 1,770 2,360
Feet

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

DARYL L. OSBY
FIRE CHIEF
FORESTER & FIRE WARDEN

RECEIVED
SEP 23 2013
BY:

September 16, 2013

Anita Gutierrez, Planner
Special Projects Section
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Dear Ms. Gutierrez:

**NOTICE OF PREPARATION, "PARCEL 44 DEVELOPMENT" PROJECT NO. R2013-01647, ENVIRONMENTAL REVIEW NO. 201300142, CONSISTS OF THE DEMOLITION OF ALL EXISTING LANDSIDE STRUCTURES ON PARCEL 44 AND REDEVELOPMENT OF THE LANDSIDE PARCEL, NORTH BY BALI WAY, EAST BY ADMIRALTY WAY, SOUTH BY MINDANAO WAY, MARINA DEL REY (FFER #201300133)**

The Notice of Preparation has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department. The following are their comments:

**PLANNING DIVISION:**

1. We will reserve our comments for the draft EIR analysis.

**LAND DEVELOPMENT UNIT:**

1. The development of this project must comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows and fire hydrants.

2. Every building constructed shall be accessible to Fire Department apparatus by way of access driveway, with an all-weather access surface of not less than 26 feet in width, clear to the sky. The access driveway shall be extended to within 150 feet of all portions of the exterior walls when measured by an unobstructed route around the exterior of the building.

3. Where the proposed building(s) exceeds a height of 35 feet, the on-site access driveway shall provide a minimum unobstructed width of 28 feet, clear-to-sky. The centerline of the access driveway shall be located parallel to and within 30 feet of an exterior wall on one side of the proposed structure.

4. The proposed improvements to the promenade within the boundary of this project shall be designed to comply with Section 22.46.1060 Part F as defined in the Marina Del Rey Specific Plan within Title 22, County of Los Angeles Zoning Code.

5. Any turns within the fire apparatus access driveway shall not be less than 32 feet measured from the centerline of the access driveway. A Fire Department approved turnaround area shall be provided for all driveways exceeding 150 feet in-length.

6. The development may require fire flows up to 5,000 gallons per minute at 20 pounds per square inch residual pressure for up to a four-hour duration. Final fire flows will be based on the size of the buildings and the types of construction used. A reduction in the required fire flow will be allowed if the structure(s) is equipped with an approved automatic fire sprinkler system, the resulting fire flow cannot be less than 2,000 gallons per minute.

7. Fire hydrant spacing shall be 300 feet and shall meet the following requirements:

   a) No portion of lot frontage shall be more than 200 feet via vehicular access from a public fire hydrant.

   b) No portion of a building shall exceed 400 feet via vehicular access from a properly spaced fire hydrant.

   c) Additional hydrants will be required if the hydrant spacing exceeds specified distances.

8. Specific fire and life safety requirements for each proposed building will be addressed during the architectural plan review by the Fire Department prior to building permit issuance. There may be additional requirements during this time.

9. The County of Los Angeles Fire Department, Land Development Unit, appreciates the opportunity to comment on this project. Should any questions arise, please contact Juan Padilla, at (323) 890-4243 or Juan.Padilla@fire.lacounty.gov.

## FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed.

**HEALTH HAZARDOUS MATERIALS DIVISION:**

1. The Health Hazardous Materials Division has no objection to the proposed project.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

Frank Vidales

FRANK VIDALES, CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

FV:ij

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov



September 12, 2013

Anita Gutierrez, AICP
County of Los Angeles
Department of Regional Planning
320 Temple Street
Los Angeles, CA 90012

**Notice of Preparation of a CEQA Document for the**
**Parcel 44 – Project Number R2013-01647, Environmental Review No. 201300142**

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The SCAQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the draft CEQA document. Please send the SCAQMD a copy of the Draft EIR upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to the SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address in our letterhead. **In addition, please send with the draft EIR all appendices or technical documents related to the air quality and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files. These include original emission calculation spreadsheets and modeling files (not Adobe PDF files). Without all files and supporting air quality documentation, the SCAQMD will be unable to complete its review of the air quality analysis in a timely manner. Any delays in providing all supporting air quality documentation will require additional time for review beyond the end of the comment period.**

**Air Quality Analysis**
The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. More recent guidance developed since this Handbook was published is also available on SCAQMD's website here: www.aqmd.gov/ceqa/hdbk.html. SCAQMD staff also recommends that the lead agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

The SCAQMD has also developed both regional and localized significance thresholds. The SCAQMD staff requests that the lead agency quantify criteria pollutant emissions and compare the results to the recommended regional significance thresholds found here: http://www.aqmd.gov/ceqa/handbook/signthres.pdf. In addition to analyzing regional air quality impacts, the SCAQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LST's can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is recommended that the lead agency perform a localized analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/ceqa/handbook/LST/LST.html.

In the event that the proposed project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the lead agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

In addition, guidance on siting incompatible land uses (such as placing homes near freeways) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Perspective*, which can be found at the following internet address: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process.

**Mitigation Measures**

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate these impacts. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying possible mitigation measures for the project, including:

- Chapter 11 of the SCAQMD *CEQA Air Quality Handbook*
- SCAQMD's CEQA web pages at: www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.
- SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions
- Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/prdas/aqguide/aqguide.html.

**Data Sources**

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's webpage (http://www.aqmd.gov).

The SCAQMD staff is available to work with the Lead Agency to ensure that project emissions are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at imacmillan@aqmd.gov or call me at (909) 396-3244.

Sincerely,

Ian V. MacMillan

Ian MacMillan
Program Supervisor, CEQA Inter-Governmental Review
Planning, Rule Development & Area Sources

LAC130820-02
Control Number

Forthcoming

# APPENDIX 4.2

## Air Quality Calculations

# Emissions Calculations

# Parcel 44 Update

## South Coast AQMD Air District, Summer

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Regional Shopping Center | 38.80 | 1000sqft | 0.89 | 38,800.00 | 0 |
| Supermarket | 13.60 | 1000sqft | 0.31 | 13,600.00 | 0 |
| Quality Restaurant | 9.90 | 1000sqft | 0.23 | 9,900.00 | 0 |
| General Office Building | 16.60 | 1000sqft | 0.38 | 16,600.00 | 0 |
| Automobile Care Center | 0.70 | 1000sqft | 0.02 | 700.00 | 0 |
| Racquet Club | 2.00 | 1000sqft | 0.05 | 2,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 11 | | | **Operational Year** | 2017 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 630.89 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Demo: 1/23/15-2/20/15
Grading: 2/21/15-4/19/15
Const: 4/20/15-8/23/16
Paving: 4/20/15-5/14/15
Coating: 7/5/16-8/23/16

Demolition -

Vehicle Trips - Trip rates for the auto care (sub for boat repair), quality rest and raquet club (sub for yacht club/lounge) modified per traffic report.

Construction Off-road Equipment Mitigation - Assume watering 3x per day per SCAQMD.

Mobile Land Use Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 36.00 |
| tblConstructionPhase | NumDays | 200.00 | 352.00 |
| tblConstructionPhase | NumDays | 20.00 | 21.00 |
| tblConstructionPhase | NumDays | 4.00 | 40.00 |
| tblConstructionPhase | NumDays | 10.00 | 19.00 |
| tblConstructionPhase | PhaseEndDate | 7/3/2015 | 8/23/2016 |
| tblConstructionPhase | PhaseEndDate | 4/17/2015 | 4/19/2015 |
| tblConstructionPhase | PhaseEndDate | 9/19/2016 | 5/14/2015 |
| tblConstructionPhase | PhaseStartDate | 5/15/2015 | 7/5/2016 |
| tblConstructionPhase | PhaseStartDate | 8/24/2016 | 4/20/2015 |
| tblGrading | AcresOfGrading | 15.00 | 1.50 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2017 |
| tblVehicleTrips | ST_TR | 62.00 | 12.50 |
| tblVehicleTrips | ST_TR | 20.87 | 22.88 |
| tblVehicleTrips | ST_TR | 94.36 | 2.86 |
| tblVehicleTrips | SU_TR | 62.00 | 12.50 |
| tblVehicleTrips | SU_TR | 26.73 | 22.88 |
| tblVehicleTrips | SU_TR | 72.16 | 2.86 |
| tblVehicleTrips | WD_TR | 62.00 | 12.50 |
| tblVehicleTrips | WD_TR | 32.93 | 22.88 |
| tblVehicleTrips | WD_TR | 89.95 | 2.86 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2015 | 5.3117 | 37.6629 | 28.4522 | 0.0438 | 4.6458 | 2.4032 | 5.8433 | 2.5107 | 2.2799 | 3.6125 | 0.0000 | 4,217.4488 | 4,217.4488 | 0.9082 | 0.0000 | 4,236.5218 |
| 2016 | 56.4319 | 24.2080 | 19.9660 | 0.0323 | 0.4389 | 1.5837 | 2.0227 | 0.1180 | 1.5339 | 1.6519 | 0.0000 | 2,992.4556 | 2,992.4556 | 0.5046 | 0.0000 | 3,003.0530 |
| **Total** | **61.7436** | **61.8709** | **48.4182** | **0.0761** | **5.0847** | **3.9869** | **7.8660** | **2.6287** | **3.8138** | **5.2644** | **0.0000** | **7,209.9043** | **7,209.9043** | **1.4129** | **0.0000** | **7,239.5748** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2015 | 5.3117 | 37.6629 | 28.4522 | 0.0438 | 1.8664 | 2.4032 | 3.0640 | 0.9936 | 2.2799 | 2.4216 | 0.0000 | 4,217.4488 | 4,217.4488 | 0.9082 | 0.0000 | 4,236.5218 |
| 2016 | 56.4319 | 24.2080 | 19.9660 | 0.0323 | 0.4389 | 1.5837 | 2.0227 | 0.1180 | 1.5339 | 1.6519 | 0.0000 | 2,992.4556 | 2,992.4556 | 0.5046 | 0.0000 | 3,003.0530 |
| **Total** | **61.7436** | **61.8709** | **48.4182** | **0.0761** | **2.3053** | **3.9869** | **5.0866** | **1.1116** | **3.8138** | **4.0735** | **0.0000** | **7,209.9043** | **7,209.9043** | **1.4129** | **0.0000** | **7,239.5748** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **54.66** | **0.00** | **35.33** | **57.71** | **0.00** | **22.62** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.1346 | 8.0000e-005 | 8.4900e-003 | 0.0000 | | 3.0000e-005 | 3.0000e-005 | | 3.0000e-005 | 3.0000e-005 | | 0.0179 | 0.0179 | 5.0000e-005 | | 0.0189 |
| Energy | 0.0860 | 0.7822 | 0.6571 | 4.6900e-003 | | 0.0595 | 0.0595 | | 0.0595 | 0.0595 | | 938.6650 | 938.6650 | 0.0180 | 0.0172 | 944.3775 |
| Mobile | 13.5854 | 27.8848 | 119.5635 | 0.2635 | 17.2093 | 0.3806 | 17.5899 | 4.5982 | 0.3503 | 4.9486 | | 22,417.9048 | 22,417.9048 | 0.8870 | | 22,436.5323 |
| **Total** | **15.8060** | **28.6671** | **120.2291** | **0.2682** | **17.2093** | **0.4401** | **17.6494** | **4.5982** | **0.4098** | **5.0080** | | **23,356.5876** | **23,356.5876** | **0.9051** | **0.0172** | **23,380.9288** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.1346 | 8.0000e-005 | 8.4900e-003 | 0.0000 | | 3.0000e-005 | 3.0000e-005 | | 3.0000e-005 | 3.0000e-005 | | 0.0179 | 0.0179 | 5.0000e-005 | | 0.0189 |
| Energy | 0.0860 | 0.7822 | 0.6571 | 4.6900e-003 | | 0.0595 | 0.0595 | | 0.0595 | 0.0595 | | 938.6650 | 938.6650 | 0.0180 | 0.0172 | 944.3775 |
| Mobile | 13.5854 | 27.8848 | 119.5635 | 0.2635 | 17.2093 | 0.3806 | 17.5899 | 4.5982 | 0.3503 | 4.9486 | | 22,417.9048 | 22,417.9048 | 0.8870 | | 22,436.5323 |
| **Total** | **15.8060** | **28.6671** | **120.2291** | **0.2682** | **17.2093** | **0.4401** | **17.6494** | **4.5982** | **0.4098** | **5.0080** | | **23,356.5876** | **23,356.5876** | **0.9051** | **0.0172** | **23,380.9288** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 1/23/2015 | 2/20/2015 | 5 | 21 | |
| 2 | Grading | Grading | 2/21/2015 | 4/19/2015 | 5 | 40 | |
| 3 | Building Construction | Building Construction | 4/20/2015 | 8/23/2016 | 5 | 352 | |
| 4 | Paving | Paving | 4/20/2015 | 5/14/2015 | 5 | 19 | |
| 5 | Architectural Coating | Architectural Coating | 7/5/2016 | 8/23/2016 | 5 | 36 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 1.5**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 122,400; Non-Residential Outdoor: 40,800 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Cement and Mortar Mixers | 1 | 6.00 | 9 | 0.56 |
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Cranes | 1 | 6.00 | 226 | 0.29 |
| Building Construction | Forklifts | 1 | 6.00 | 89 | 0.20 |
| Paving | Pavers | 1 | 6.00 | 125 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Rubber Tired Dozers | 1 | 6.00 | 255 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Demolition | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Grading | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 6.00 | 174 | 0.41 |
| Paving | Paving Equipment | 1 | 8.00 | 130 | 0.36 |
| Building Construction | Welders | 3 | 8.00 | 46 | 0.45 |

## Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 5 | 13.00 | 0.00 | 67.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 3 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 7 | 27.00 | 13.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 5 | 13.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

## 3.2 Demolition - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6902 | 0.0000 | 0.6902 | 0.1045 | 0.0000 | 0.1045 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.0666 | 29.6778 | 22.0566 | 0.0245 | | 1.8651 | 1.8651 | | 1.7469 | 1.7469 | | 2,509.0599 | 2,509.0599 | 0.6357 | | 2,522.4104 |
| **Total** | **3.0666** | **29.6778** | **22.0566** | **0.0245** | **0.6902** | **1.8651** | **2.5553** | **0.1045** | **1.7469** | **1.8514** | | **2,509.0599** | **2,509.0599** | **0.6357** | | **2,522.4104** |

### 3.2 Demolition - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0618 | 0.9922 | 0.6686 | 2.3600e-003 | 0.0556 | 0.0173 | 0.0729 | 0.0152 | 0.0159 | 0.0311 | | 239.7857 | 239.7857 | 1.8800e-003 | | 239.8251 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0602 | 0.0753 | 0.9333 | 1.8400e-003 | 0.1453 | 1.2800e-003 | 0.1466 | 0.0385 | 1.1700e-003 | 0.0397 | | 160.1468 | 160.1468 | 8.6200e-003 | | 160.3279 |
| **Total** | **0.1220** | **1.0675** | **1.6020** | **4.2000e-003** | **0.2009** | **0.0186** | **0.2195** | **0.0538** | **0.0171** | **0.0708** | | **399.9325** | **399.9325** | **0.0105** | | **400.1530** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2692 | 0.0000 | 0.2692 | 0.0408 | 0.0000 | 0.0408 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.0666 | 29.6778 | 22.0566 | 0.0245 | | 1.8651 | 1.8651 | | 1.7469 | 1.7469 | 0.0000 | 2,509.0599 | 2,509.0599 | 0.6357 | | 2,522.4104 |
| **Total** | **3.0666** | **29.6778** | **22.0566** | **0.0245** | **0.2692** | **1.8651** | **2.1343** | **0.0408** | **1.7469** | **1.7877** | **0.0000** | **2,509.0599** | **2,509.0599** | **0.6357** | | **2,522.4104** |

### 3.2 Demolition - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0618 | 0.9922 | 0.6686 | 2.3600e-003 | 0.0556 | 0.0173 | 0.0729 | 0.0152 | 0.0159 | 0.0311 | | 239.7857 | 239.7857 | 1.8800e-003 | | 239.8251 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0602 | 0.0753 | 0.9333 | 1.8400e-003 | 0.1453 | 1.2800e-003 | 0.1466 | 0.0385 | 1.1700e-003 | 0.0397 | | 160.1468 | 160.1468 | 8.6200e-003 | | 160.3279 |
| **Total** | **0.1220** | **1.0675** | **1.6020** | **4.2000e-003** | **0.2009** | **0.0186** | **0.2195** | **0.0538** | **0.0171** | **0.0708** | | **399.9325** | **399.9325** | **0.0105** | | **400.1530** |

### 3.3 Grading - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 4.5563 | 0.0000 | 4.5563 | 2.4870 | 0.0000 | 2.4870 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.0666 | 21.9443 | 14.0902 | 0.0141 | | 1.1968 | 1.1968 | | 1.1011 | 1.1011 | | 1,479.8000 | 1,479.8000 | 0.4418 | | 1,489.0774 |
| **Total** | **2.0666** | **21.9443** | **14.0902** | **0.0141** | **4.5563** | **1.1968** | **5.7531** | **2.4870** | **1.1011** | **3.5880** | | **1,479.8000** | **1,479.8000** | **0.4418** | | **1,489.0774** |

## 3.3 Grading - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0370 | 0.0463 | 0.5744 | 1.1300e-003 | 0.0894 | 7.9000e-004 | 0.0902 | 0.0237 | 7.2000e-004 | 0.0244 | | 98.5519 | 98.5519 | 5.3100e-003 | | 98.6633 |
| **Total** | **0.0370** | **0.0463** | **0.5744** | **1.1300e-003** | **0.0894** | **7.9000e-004** | **0.0902** | **0.0237** | **7.2000e-004** | **0.0244** | | **98.5519** | **98.5519** | **5.3100e-003** | | **98.6633** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 1.7770 | 0.0000 | 1.7770 | 0.9699 | 0.0000 | 0.9699 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.0666 | 21.9443 | 14.0902 | 0.0141 | | 1.1968 | 1.1968 | | 1.1011 | 1.1011 | 0.0000 | 1,479.8000 | 1,479.8000 | 0.4418 | | 1,489.0774 |
| **Total** | **2.0666** | **21.9443** | **14.0902** | **0.0141** | **1.7770** | **1.1968** | **2.9738** | **0.9699** | **1.1011** | **2.0710** | **0.0000** | **1,479.8000** | **1,479.8000** | **0.4418** | | **1,489.0774** |

## 3.3 Grading - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0370 | 0.0463 | 0.5744 | 1.1300e-003 | 0.0894 | 7.9000e-004 | 0.0902 | 0.0237 | 7.2000e-004 | 0.0244 | | 98.5519 | 98.5519 | 5.3100e-003 | | 98.6633 |
| **Total** | **0.0370** | **0.0463** | **0.5744** | **1.1300e-003** | **0.0894** | **7.9000e-004** | **0.0902** | **0.0237** | **7.2000e-004** | **0.0244** | | **98.5519** | **98.5519** | **5.3100e-003** | | **98.6633** |

## 3.4 Building Construction - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6000 | 21.5642 | 15.0041 | 0.0220 | | 1.4851 | 1.4851 | | 1.4344 | 1.4344 | | 2,055.6247 | 2,055.6247 | 0.4741 | | 2,065.5812 |
| **Total** | **3.6000** | **21.5642** | **15.0041** | **0.0220** | | **1.4851** | **1.4851** | | **1.4344** | **1.4344** | | **2,055.6247** | **2,055.6247** | **0.4741** | | **2,065.5812** |

## 3.4 Building Construction - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.1225 | 1.2712 | 1.4069 | 2.8300e-003 | 0.0812 | 0.0222 | 0.1035 | 0.0231 | 0.0204 | 0.0436 | | 286.5944 | 286.5944 | 2.2400e-003 | | 286.6414 |
| Worker | 0.1250 | 0.1563 | 1.9384 | 3.8300e-003 | 0.3018 | 2.6600e-003 | 0.3045 | 0.0800 | 2.4300e-003 | 0.0825 | | 332.6127 | 332.6127 | 0.0179 | | 332.9887 |
| **Total** | **0.2474** | **1.4275** | **3.3453** | **6.6600e-003** | **0.3830** | **0.0249** | **0.4079** | **0.1032** | **0.0229** | **0.1260** | | **619.2071** | **619.2071** | **0.0202** | | **619.6302** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6000 | 21.5642 | 15.0041 | 0.0220 | | 1.4851 | 1.4851 | | 1.4344 | 1.4344 | 0.0000 | 2,055.6247 | 2,055.6247 | 0.4741 | | 2,065.5812 |
| **Total** | **3.6000** | **21.5642** | **15.0041** | **0.0220** | | **1.4851** | **1.4851** | | **1.4344** | **1.4344** | **0.0000** | **2,055.6247** | **2,055.6247** | **0.4741** | | **2,065.5812** |

## 3.4 Building Construction - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.1225 | 1.2712 | 1.4069 | 2.8300e-003 | 0.0812 | 0.0222 | 0.1035 | 0.0231 | 0.0204 | 0.0436 | | 286.5944 | 286.5944 | 2.2400e-003 | | 286.6414 |
| Worker | 0.1250 | 0.1563 | 1.9384 | 3.8300e-003 | 0.3018 | 2.6600e-003 | 0.3045 | 0.0800 | 2.4300e-003 | 0.0825 | | 332.6127 | 332.6127 | 0.0179 | | 332.9887 |
| **Total** | **0.2474** | **1.4275** | **3.3453** | **6.6600e-003** | **0.3830** | **0.0249** | **0.4079** | **0.1032** | **0.0229** | **0.1260** | | **619.2071** | **619.2071** | **0.0202** | | **619.6302** |

## 3.4 Building Construction - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.2915 | 20.5459 | 14.7074 | 0.0220 | | 1.3656 | 1.3656 | | 1.3176 | 1.3176 | | 2,046.9432 | 2,046.9432 | 0.4499 | | 2,056.3913 |
| **Total** | **3.2915** | **20.5459** | **14.7074** | **0.0220** | | **1.3656** | **1.3656** | | **1.3176** | **1.3176** | | **2,046.9432** | **2,046.9432** | **0.4499** | | **2,056.3913** |

## 3.4 Building Construction - 2016

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.1082 | 1.1228 | 1.2947 | 2.8300e-003 | 0.0813 | 0.0185 | 0.0997 | 0.0231 | 0.0170 | 0.0401 | | 283.4376 | 283.4376 | 2.0200e-003 | | 283.4801 |
| Worker | 0.1128 | 0.1410 | 1.7551 | 3.8200e-003 | 0.3018 | 2.5200e-003 | 0.3043 | 0.0800 | 2.3200e-003 | 0.0824 | | 321.1538 | 321.1538 | 0.0165 | | 321.4998 |
| **Total** | **0.2210** | **1.2638** | **3.0497** | **6.6500e-003** | **0.3831** | **0.0210** | **0.4041** | **0.1032** | **0.0193** | **0.1225** | | **604.5914** | **604.5914** | **0.0185** | | **604.9799** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.2915 | 20.5459 | 14.7074 | 0.0220 | | 1.3656 | 1.3656 | | 1.3176 | 1.3176 | 0.0000 | 2,046.9432 | 2,046.9432 | 0.4499 | | 2,056.3913 |
| **Total** | **3.2915** | **20.5459** | **14.7074** | **0.0220** | | **1.3656** | **1.3656** | | **1.3176** | **1.3176** | **0.0000** | **2,046.9432** | **2,046.9432** | **0.4499** | | **2,056.3913** |

## 3.4 Building Construction - 2016

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.1082 | 1.1228 | 1.2947 | 2.8300e-003 | 0.0813 | 0.0185 | 0.0997 | 0.0231 | 0.0170 | 0.0401 | | 283.4376 | 283.4376 | 2.0200e-003 | | 283.4801 |
| Worker | 0.1128 | 0.1410 | 1.7551 | 3.8200e-003 | 0.3018 | 2.5200e-003 | 0.3043 | 0.0800 | 2.3200e-003 | 0.0824 | | 321.1538 | 321.1538 | 0.0165 | | 321.4998 |
| **Total** | **0.2210** | **1.2638** | **3.0497** | **6.6500e-003** | **0.3831** | **0.0210** | **0.4041** | **0.1032** | **0.0193** | **0.1225** | | **604.5914** | **604.5914** | **0.0185** | | **604.9799** |

## 3.5 Paving - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4041 | 14.5959 | 9.1695 | 0.0133 | | 0.8919 | 0.8919 | | 0.8215 | 0.8215 | | 1,382.4703 | 1,382.4703 | 0.4054 | | 1,390.9826 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4041** | **14.5959** | **9.1695** | **0.0133** | | **0.8919** | **0.8919** | | **0.8215** | **0.8215** | | **1,382.4703** | **1,382.4703** | **0.4054** | | **1,390.9826** |

## 3.5 Paving - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0602 | 0.0753 | 0.9333 | 1.8400e-003 | 0.1453 | 1.2800e-003 | 0.1466 | 0.0385 | 1.1700e-003 | 0.0397 | | 160.1468 | 160.1468 | 8.6200e-003 | | 160.3279 |
| **Total** | **0.0602** | **0.0753** | **0.9333** | **1.8400e-003** | **0.1453** | **1.2800e-003** | **0.1466** | **0.0385** | **1.1700e-003** | **0.0397** | | **160.1468** | **160.1468** | **8.6200e-003** | | **160.3279** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4041 | 14.5959 | 9.1695 | 0.0133 | | 0.8919 | 0.8919 | | 0.8215 | 0.8215 | 0.0000 | 1,382.470 3 | 1,382.470 3 | 0.4054 | | 1,390.982 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4041** | **14.5959** | **9.1695** | **0.0133** | | **0.8919** | **0.8919** | | **0.8215** | **0.8215** | **0.0000** | **1,382.470 3** | **1,382.470 3** | **0.4054** | | **1,390.982 6** |

## 3.5 Paving - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0602 | 0.0753 | 0.9333 | 1.8400e-003 | 0.1453 | 1.2800e-003 | 0.1466 | 0.0385 | 1.1700e-003 | 0.0397 | | 160.1468 | 160.1468 | 8.6200e-003 | | 160.3279 |
| **Total** | **0.0602** | **0.0753** | **0.9333** | **1.8400e-003** | **0.1453** | **1.2800e-003** | **0.1466** | **0.0385** | **1.1700e-003** | **0.0397** | | **160.1468** | **160.1468** | **8.6200e-003** | | **160.3279** |

## 3.6 Architectural Coating - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 52.5300 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3685 | 2.3722 | 1.8839 | 2.9700e-003 | | 0.1966 | 0.1966 | | 0.1966 | 0.1966 | | 281.4481 | 281.4481 | 0.0332 | | 282.1449 |
| **Total** | **52.8985** | **2.3722** | **1.8839** | **2.9700e-003** | | **0.1966** | **0.1966** | | **0.1966** | **0.1966** | | **281.4481** | **281.4481** | **0.0332** | | **282.1449** |

## 3.6 Architectural Coating - 2016

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0209 | 0.0261 | 0.3250 | 7.1000e-004 | 0.0559 | 4.7000e-004 | 0.0564 | 0.0148 | 4.3000e-004 | 0.0153 | | 59.4729 | 59.4729 | 3.0500e-003 | | 59.5370 |
| **Total** | **0.0209** | **0.0261** | **0.3250** | **7.1000e-004** | **0.0559** | **4.7000e-004** | **0.0564** | **0.0148** | **4.3000e-004** | **0.0153** | | **59.4729** | **59.4729** | **3.0500e-003** | | **59.5370** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 52.5300 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3685 | 2.3722 | 1.8839 | 2.9700e-003 | | 0.1966 | 0.1966 | | 0.1966 | 0.1966 | 0.0000 | 281.4481 | 281.4481 | 0.0332 | | 282.1449 |
| **Total** | **52.8985** | **2.3722** | **1.8839** | **2.9700e-003** | | **0.1966** | **0.1966** | | **0.1966** | **0.1966** | **0.0000** | **281.4481** | **281.4481** | **0.0332** | | **282.1449** |

## 3.6 Architectural Coating - 2016

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0209 | 0.0261 | 0.3250 | 7.1000e-004 | 0.0559 | 4.7000e-004 | 0.0564 | 0.0148 | 4.3000e-004 | 0.0153 | | 59.4729 | 59.4729 | 3.0500e-003 | | 59.5370 |
| **Total** | **0.0209** | **0.0261** | **0.3250** | **7.1000e-004** | **0.0559** | **4.7000e-004** | **0.0564** | **0.0148** | **4.3000e-004** | **0.0153** | | **59.4729** | **59.4729** | **3.0500e-003** | | **59.5370** |

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 13.5854 | 27.8848 | 119.5635 | 0.2635 | 17.2093 | 0.3806 | 17.5899 | 4.5982 | 0.3503 | 4.9486 | | 22,417.9048 | 22,417.9048 | 0.8870 | | 22,436.5323 |
| Unmitigated | 13.5854 | 27.8848 | 119.5635 | 0.2635 | 17.2093 | 0.3806 | 17.5899 | 4.5982 | 0.3503 | 4.9486 | | 22,417.9048 | 22,417.9048 | 0.8870 | | 22,436.5323 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Automobile Care Center | 8.75 | 8.75 | 8.75 | 11,721 | 11,721 |
| General Office Building | 182.77 | 39.34 | 16.27 | 446,145 | 446,145 |
| Racquet Club | 45.76 | 45.76 | 45.76 | 93,316 | 93,316 |
| Quality Restaurant | 28.31 | 28.31 | 28.31 | 40,309 | 40,309 |
| Regional Shopping Center | 1,666.07 | 1,938.84 | 979.31 | 3,475,538 | 3,475,538 |
| Supermarket | 1,390.46 | 2,415.22 | 2263.58 | 2,192,419 | 2,192,419 |
| Total | 3,322.13 | 4,476.23 | 3,341.99 | 6,259,448 | 6,259,448 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Automobile Care Center | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 21 | 51 | 28 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| Racquet Club | 16.60 | 8.40 | 6.90 | 11.50 | 69.50 | 19.00 | 52 | 39 | 9 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |
| Supermarket | 16.60 | 8.40 | 6.90 | 6.50 | 74.50 | 19.00 | 34 | 30 | 36 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.512163 | 0.060173 | 0.180257 | 0.139094 | 0.042244 | 0.006664 | 0.016017 | 0.031880 | 0.001940 | 0.002497 | 0.004356 | 0.000592 | 0.002122 |

### 4.4 Fleet Mix

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0860 | 0.7822 | 0.6571 | 4.6900e-003 | | 0.0595 | 0.0595 | | 0.0595 | 0.0595 | | 938.6650 | 938.6650 | 0.0180 | 0.0172 | 944.3775 |
| NaturalGas Unmitigated | 0.0860 | 0.7822 | 0.6571 | 4.6900e-003 | | 0.0595 | 0.0595 | | 0.0595 | 0.0595 | | 938.6650 | 938.6650 | 0.0180 | 0.0172 | 944.3775 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Quality Restaurant | 6320 | 0.0682 | 0.6196 | 0.5205 | 3.7200e-003 | | 0.0471 | 0.0471 | | 0.0471 | 0.0471 | | 743.5291 | 743.5291 | 0.0143 | 0.0136 | 748.0541 |
| Racquet Club | 103.068 | 1.1100e-003 | 0.0101 | 8.4900e-003 | 6.0000e-005 | | 7.7000e-004 | 7.7000e-004 | | 7.7000e-004 | 7.7000e-004 | | 12.1257 | 12.1257 | 2.3000e-004 | 2.2000e-004 | 12.1995 |
| Regional Shopping Center | 180.712 | 1.9500e-003 | 0.0177 | 0.0149 | 1.1000e-004 | | 1.3500e-003 | 1.3500e-003 | | 1.3500e-003 | 1.3500e-003 | | 21.2603 | 21.2603 | 4.1000e-004 | 3.9000e-004 | 21.3897 |
| Supermarket | 841.71 | 9.0800e-003 | 0.0825 | 0.0693 | 5.0000e-004 | | 6.2700e-003 | 6.2700e-003 | | 6.2700e-003 | 6.2700e-003 | | 99.0247 | 99.0247 | 1.9000e-003 | 1.8200e-003 | 99.6273 |
| Automobile Care Center | 36.074 | 3.9000e-004 | 3.5400e-003 | 2.9700e-003 | 2.0000e-005 | | 2.7000e-004 | 2.7000e-004 | | 2.7000e-004 | 2.7000e-004 | | 4.2440 | 4.2440 | 8.0000e-005 | 8.0000e-005 | 4.2698 |
| General Office Building | 497.09 | 5.3600e-003 | 0.0487 | 0.0409 | 2.9000e-004 | | 3.7000e-003 | 3.7000e-003 | | 3.7000e-003 | 3.7000e-003 | | 58.4812 | 58.4812 | 1.1200e-003 | 1.0700e-003 | 58.8371 |
| **Total** | | **0.0861** | **0.7822** | **0.6571** | **4.7000e-003** | | **0.0595** | **0.0595** | | **0.0595** | **0.0595** | | **938.6650** | **938.6650** | **0.0180** | **0.0172** | **944.3775** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Quality Restaurant | 6.32 | 0.0682 | 0.6196 | 0.5205 | 3.7200e-003 | | 0.0471 | 0.0471 | | 0.0471 | 0.0471 | | 743.5291 | 743.5291 | 0.0143 | 0.0136 | 748.0541 |
| Racquet Club | 0.103068 | 1.1100e-003 | 0.0101 | 8.4900e-003 | 6.0000e-005 | | 7.7000e-004 | 7.7000e-004 | | 7.7000e-004 | 7.7000e-004 | | 12.1257 | 12.1257 | 2.3000e-004 | 2.2000e-004 | 12.1995 |
| Regional Shopping Center | 0.180712 | 1.9500e-003 | 0.0177 | 0.0149 | 1.1000e-004 | | 1.3500e-003 | 1.3500e-003 | | 1.3500e-003 | 1.3500e-003 | | 21.2603 | 21.2603 | 4.1000e-004 | 3.9000e-004 | 21.3897 |
| Supermarket | 0.84171 | 9.0800e-003 | 0.0825 | 0.0693 | 5.0000e-004 | | 6.2700e-003 | 6.2700e-003 | | 6.2700e-003 | 6.2700e-003 | | 99.0247 | 99.0247 | 1.9000e-003 | 1.8200e-003 | 99.6273 |
| Automobile Care Center | 0.036074 | 3.9000e-004 | 3.5400e-003 | 2.9700e-003 | 2.0000e-005 | | 2.7000e-004 | 2.7000e-004 | | 2.7000e-004 | 2.7000e-004 | | 4.2440 | 4.2440 | 8.0000e-005 | 8.0000e-005 | 4.2698 |
| General Office Building | 0.49709 | 5.3600e-003 | 0.0487 | 0.0409 | 2.9000e-004 | | 3.7000e-003 | 3.7000e-003 | | 3.7000e-003 | 3.7000e-003 | | 58.4812 | 58.4812 | 1.1200e-003 | 1.0700e-003 | 58.8371 |
| **Total** | | **0.0861** | **0.7822** | **0.6571** | **4.7000e-003** | | **0.0595** | **0.0595** | | **0.0595** | **0.0595** | | **938.6650** | **938.6650** | **0.0180** | **0.0172** | **944.3775** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 2.1346 | 8.0000e-005 | 8.4900e-003 | 0.0000 | | 3.0000e-005 | 3.0000e-005 | | 3.0000e-005 | 3.0000e-005 | | 0.0179 | 0.0179 | 5.0000e-005 | | 0.0189 |
| Unmitigated | 2.1346 | 8.0000e-005 | 8.4900e-003 | 0.0000 | | 3.0000e-005 | 3.0000e-005 | | 3.0000e-005 | 3.0000e-005 | | 0.0179 | 0.0179 | 5.0000e-005 | | 0.0189 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.5181 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.6157 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 8.2000e-004 | 8.0000e-005 | 8.4900e-003 | 0.0000 | | 3.0000e-005 | 3.0000e-005 | | 3.0000e-005 | 3.0000e-005 | | 0.0179 | 0.0179 | 5.0000e-005 | | 0.0189 |
| **Total** | **2.1346** | **8.0000e-005** | **8.4900e-003** | **0.0000** | | **3.0000e-005** | **3.0000e-005** | | **3.0000e-005** | **3.0000e-005** | | **0.0179** | **0.0179** | **5.0000e-005** | | **0.0189** |

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.5181 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.6157 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 8.2000e-004 | 8.0000e-005 | 8.4900e-003 | 0.0000 | | 3.0000e-005 | 3.0000e-005 | | 3.0000e-005 | 3.0000e-005 | | 0.0179 | 0.0179 | 5.0000e-005 | | 0.0189 |
| **Total** | **2.1346** | **8.0000e-005** | **8.4900e-003** | **0.0000** | | **3.0000e-005** | **3.0000e-005** | | **3.0000e-005** | **3.0000e-005** | | **0.0179** | **0.0179** | **5.0000e-005** | | **0.0189** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Vegetation

# Parcel 44 Update

**South Coast AQMD Air District, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 16.60 | 1000sqft | 0.38 | 16,600.00 | 0 |
| Quality Restaurant | 9.90 | 1000sqft | 0.23 | 9,900.00 | 0 |
| Racquet Club | 2.00 | 1000sqft | 0.05 | 2,000.00 | 0 |
| Automobile Care Center | 0.70 | 1000sqft | 0.02 | 700.00 | 0 |
| Regional Shopping Center | 38.80 | 1000sqft | 0.89 | 38,800.00 | 0 |
| Supermarket | 13.60 | 1000sqft | 0.31 | 13,600.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 11 | | | **Operational Year** | 2017 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 630.89 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Demo: 1/23/15-2/20/15
Grading: 2/21/15-4/19/15
Const: 4/20/15-8/23/16
Paving: 4/20/15-5/14/15
Coating: 7/5/16-8/23/16

Demolition -

Vehicle Trips - Trip rates for the auto care (sub for boat repair), quality rest and raquet club (sub for yacht club/lounge) modified per traffic report.

Construction Off-road Equipment Mitigation - Assume watering 3x per day per SCAQMD.

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 36.00 |
| tblConstructionPhase | NumDays | 200.00 | 352.00 |
| tblConstructionPhase | NumDays | 20.00 | 21.00 |
| tblConstructionPhase | NumDays | 4.00 | 40.00 |
| tblConstructionPhase | NumDays | 10.00 | 19.00 |
| tblConstructionPhase | PhaseEndDate | 7/3/2015 | 8/23/2016 |
| tblConstructionPhase | PhaseEndDate | 4/17/2015 | 4/19/2015 |
| tblConstructionPhase | PhaseEndDate | 9/19/2016 | 5/14/2015 |
| tblConstructionPhase | PhaseStartDate | 5/15/2015 | 7/5/2016 |
| tblConstructionPhase | PhaseStartDate | 8/24/2016 | 4/20/2015 |
| tblGrading | AcresOfGrading | 15.00 | 1.50 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2017 |
| tblVehicleTrips | ST_TR | 62.00 | 12.50 |
| tblVehicleTrips | ST_TR | 94.36 | 2.86 |
| tblVehicleTrips | ST_TR | 20.87 | 22.88 |
| tblVehicleTrips | SU_TR | 62.00 | 12.50 |
| tblVehicleTrips | SU_TR | 72.16 | 2.86 |
| tblVehicleTrips | SU_TR | 26.73 | 22.88 |
| tblVehicleTrips | WD_TR | 62.00 | 12.50 |
| tblVehicleTrips | WD_TR | 89.95 | 2.86 |
| tblVehicleTrips | WD_TR | 32.93 | 22.88 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2015 | 0.4437 | 3.0254 | 2.3358 | 3.3600e-003 | 0.1382 | 0.1911 | 0.3293 | 0.0616 | 0.1825 | 0.2440 | 0.0000 | 291.2631 | 291.2631 | 0.0591 | 0.0000 | 292.5040 |
| 2016 | 1.2478 | 1.8811 | 1.5411 | 2.4500e-003 | 0.0326 | 0.1200 | 0.1526 | 8.7900e-003 | 0.1159 | 0.1246 | 0.0000 | 206.3403 | 206.3403 | 0.0363 | 0.0000 | 207.1023 |
| **Total** | **1.6916** | **4.9065** | **3.8769** | **5.8100e-003** | **0.1708** | **0.3112** | **0.4819** | **0.0703** | **0.2983** | **0.3686** | **0.0000** | **497.6034** | **497.6034** | **0.0954** | **0.0000** | **499.6063** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2015 | 0.4437 | 3.0254 | 2.3358 | 3.3600e-003 | 0.0782 | 0.1911 | 0.2693 | 0.0305 | 0.1825 | 0.2130 | 0.0000 | 291.2628 | 291.2628 | 0.0591 | 0.0000 | 292.5037 |
| 2016 | 1.2478 | 1.8811 | 1.5411 | 2.4500e-003 | 0.0326 | 0.1200 | 0.1526 | 8.7900e-003 | 0.1159 | 0.1246 | 0.0000 | 206.3401 | 206.3401 | 0.0363 | 0.0000 | 207.1021 |
| **Total** | **1.6916** | **4.9065** | **3.8769** | **5.8100e-003** | **0.1108** | **0.3112** | **0.4219** | **0.0393** | **0.2983** | **0.3376** | **0.0000** | **497.6029** | **497.6029** | **0.0954** | **0.0000** | **499.6059** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **35.14** | **0.00** | **12.45** | **44.09** | **0.00** | **8.41** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.3895 | 1.0000e-005 | 1.0600e-003 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0300e-003 | 2.0300e-003 | 1.0000e-005 | 0.0000 | 2.1400e-003 |
| Energy | 0.0157 | 0.1428 | 0.1199 | 8.6000e-004 | | 0.0109 | 0.0109 | | 0.0109 | 0.0109 | 0.0000 | 687.5195 | 687.5195 | 0.0274 | 7.9100e-003 | 690.5478 |
| Mobile | 1.8421 | 4.1548 | 17.1912 | 0.0355 | 2.3722 | 0.0534 | 2.4256 | 0.6348 | 0.0492 | 0.6840 | 0.0000 | 2,746.4223 | 2,746.4223 | 0.1126 | 0.0000 | 2,748.7863 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 31.6625 | 0.0000 | 31.6625 | 1.8712 | 0.0000 | 70.9578 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 3.3914 | 52.3157 | 55.7071 | 0.3507 | 8.7200e-003 | 65.7766 |
| **Total** | **2.2474** | **4.2976** | **17.3122** | **0.0364** | **2.3722** | **0.0643** | **2.4365** | **0.6348** | **0.0600** | **0.6948** | **35.0540** | **3,486.2596** | **3,521.3136** | **2.3620** | **0.0166** | **3,576.0706** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.3895 | 1.0000e-005 | 1.0600e-003 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0300e-003 | 2.0300e-003 | 1.0000e-005 | 0.0000 | 2.1400e-003 |
| Energy | 0.0157 | 0.1428 | 0.1199 | 8.6000e-004 | | 0.0109 | 0.0109 | | 0.0109 | 0.0109 | 0.0000 | 682.9427 | 682.9427 | 0.0272 | 7.8700e-003 | 685.9530 |
| Mobile | 1.8421 | 4.1548 | 17.1912 | 0.0355 | 2.3722 | 0.0534 | 2.4256 | 0.6348 | 0.0492 | 0.6840 | 0.0000 | 2,746.4223 | 2,746.4223 | 0.1126 | 0.0000 | 2,748.7863 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 25.3300 | 0.0000 | 25.3300 | 1.4970 | 0.0000 | 56.7662 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 2.7132 | 44.3492 | 47.0623 | 0.2807 | 6.9900e-003 | 55.1233 |
| **Total** | **2.2474** | **4.2976** | **17.3122** | **0.0364** | **2.3722** | **0.0643** | **2.4365** | **0.6348** | **0.0600** | **0.6948** | **28.0432** | **3,473.7163** | **3,501.7594** | **1.9174** | **0.0149** | **3,546.6310** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **20.00** | **0.36** | **0.56** | **18.82** | **10.64** | **0.82** |

# 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 1/23/2015 | 2/20/2015 | 5 | 21 | |
| 2 | Grading | Grading | 2/21/2015 | 4/19/2015 | 5 | 40 | |
| 3 | Building Construction | Building Construction | 4/20/2015 | 8/23/2016 | 5 | 352 | |
| 4 | Paving | Paving | 4/20/2015 | 5/14/2015 | 5 | 19 | |
| 5 | Architectural Coating | Architectural Coating | 7/5/2016 | 8/23/2016 | 5 | 36 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 1.5**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 122,400; Non-Residential Outdoor: 40,800 (Architectural Coating – sqft)**

**<u>OffRoad Equipment</u>**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 6.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 6.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 6.00 | 226 | 0.29 |
| Building Construction | Forklifts | 1 | 6.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Building Construction | Welders | 3 | 8.00 | 46 | 0.45 |
| Paving | Cement and Mortar Mixers | 1 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 6.00 | 125 | 0.42 |
| Paving | Paving Equipment | 1 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

## Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 5 | 13.00 | 0.00 | 67.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 3 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 7 | 27.00 | 13.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 5 | 13.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

## 3.2 Demolition - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 7.2500e-003 | 0.0000 | 7.2500e-003 | 1.1000e-003 | 0.0000 | 1.1000e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0322 | 0.3116 | 0.2316 | 2.6000e-004 | | 0.0196 | 0.0196 | | 0.0183 | 0.0183 | 0.0000 | 23.8999 | 23.8999 | 6.0600e-003 | 0.0000 | 24.0271 |
| **Total** | **0.0322** | **0.3116** | **0.2316** | **2.6000e-004** | **7.2500e-003** | **0.0196** | **0.0268** | **1.1000e-003** | **0.0183** | **0.0194** | **0.0000** | **23.8999** | **23.8999** | **6.0600e-003** | **0.0000** | **24.0271** |

## 3.2 Demolition - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 6.8000e-004 | 0.0110 | 7.8400e-003 | 2.0000e-005 | 5.7000e-004 | 1.8000e-004 | 7.6000e-004 | 1.6000e-004 | 1.7000e-004 | 3.2000e-004 | 0.0000 | 2.2818 | 2.2818 | 2.0000e-005 | 0.0000 | 2.2822 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.1000e-004 | 8.9000e-004 | 9.2700e-003 | 2.0000e-005 | 1.5000e-003 | 1.0000e-005 | 1.5100e-003 | 4.0000e-004 | 1.0000e-005 | 4.1000e-004 | 0.0000 | 1.4533 | 1.4533 | 8.0000e-005 | 0.0000 | 1.4550 |
| **Total** | **1.2900e-003** | **0.0119** | **0.0171** | **4.0000e-005** | **2.0700e-003** | **1.9000e-004** | **2.2700e-003** | **5.6000e-004** | **1.8000e-004** | **7.3000e-004** | **0.0000** | **3.7351** | **3.7351** | **1.0000e-004** | **0.0000** | **3.7372** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.8300e-003 | 0.0000 | 2.8300e-003 | 4.3000e-004 | 0.0000 | 4.3000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0322 | 0.3116 | 0.2316 | 2.6000e-004 | | 0.0196 | 0.0196 | | 0.0183 | 0.0183 | 0.0000 | 23.8999 | 23.8999 | 6.0600e-003 | 0.0000 | 24.0270 |
| **Total** | **0.0322** | **0.3116** | **0.2316** | **2.6000e-004** | **2.8300e-003** | **0.0196** | **0.0224** | **4.3000e-004** | **0.0183** | **0.0188** | **0.0000** | **23.8999** | **23.8999** | **6.0600e-003** | **0.0000** | **24.0270** |

## 3.2 Demolition - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 6.8000e-004 | 0.0110 | 7.8400e-003 | 2.0000e-005 | 5.7000e-004 | 1.8000e-004 | 7.6000e-004 | 1.6000e-004 | 1.7000e-004 | 3.2000e-004 | 0.0000 | 2.2818 | 2.2818 | 2.0000e-005 | 0.0000 | 2.2822 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.1000e-004 | 8.9000e-004 | 9.2700e-003 | 2.0000e-005 | 1.5000e-003 | 1.0000e-005 | 1.5100e-003 | 4.0000e-004 | 1.0000e-005 | 4.1000e-004 | 0.0000 | 1.4533 | 1.4533 | 8.0000e-005 | 0.0000 | 1.4550 |
| **Total** | **1.2900e-003** | **0.0119** | **0.0171** | **4.0000e-005** | **2.0700e-003** | **1.9000e-004** | **2.2700e-003** | **5.6000e-004** | **1.8000e-004** | **7.3000e-004** | **0.0000** | **3.7351** | **3.7351** | **1.0000e-004** | **0.0000** | **3.7372** |

## 3.3 Grading - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0911 | 0.0000 | 0.0911 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0413 | 0.4389 | 0.2818 | 2.8000e-004 | | 0.0239 | 0.0239 | | 0.0220 | 0.0220 | 0.0000 | 26.8490 | 26.8490 | 8.0200e-003 | 0.0000 | 27.0174 |
| **Total** | **0.0413** | **0.4389** | **0.2818** | **2.8000e-004** | **0.0911** | **0.0239** | **0.1151** | **0.0497** | **0.0220** | **0.0718** | **0.0000** | **26.8490** | **26.8490** | **8.0200e-003** | **0.0000** | **27.0174** |

## 3.3 Grading - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.1000e-004 | 1.0500e-003 | 0.0109 | 2.0000e-005 | 1.7600e-003 | 2.0000e-005 | 1.7700e-003 | 4.7000e-004 | 1.0000e-005 | 4.8000e-004 | 0.0000 | 1.7035 | 1.7035 | 1.0000e-004 | 0.0000 | 1.7055 |
| **Total** | **7.1000e-004** | **1.0500e-003** | **0.0109** | **2.0000e-005** | **1.7600e-003** | **2.0000e-005** | **1.7700e-003** | **4.7000e-004** | **1.0000e-005** | **4.8000e-004** | **0.0000** | **1.7035** | **1.7035** | **1.0000e-004** | **0.0000** | **1.7055** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0355 | 0.0000 | 0.0355 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0413 | 0.4389 | 0.2818 | 2.8000e-004 | | 0.0239 | 0.0239 | | 0.0220 | 0.0220 | 0.0000 | 26.8490 | 26.8490 | 8.0200e-003 | 0.0000 | 27.0173 |
| **Total** | **0.0413** | **0.4389** | **0.2818** | **2.8000e-004** | **0.0355** | **0.0239** | **0.0595** | **0.0194** | **0.0220** | **0.0414** | **0.0000** | **26.8490** | **26.8490** | **8.0200e-003** | **0.0000** | **27.0173** |

## 3.3 Grading - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.1000e-004 | 1.0500e-003 | 0.0109 | 2.0000e-005 | 1.7600e-003 | 2.0000e-005 | 1.7700e-003 | 4.7000e-004 | 1.0000e-005 | 4.8000e-004 | 0.0000 | 1.7035 | 1.7035 | 1.0000e-004 | 0.0000 | 1.7055 |
| **Total** | **7.1000e-004** | **1.0500e-003** | **0.0109** | **2.0000e-005** | **1.7600e-003** | **2.0000e-005** | **1.7700e-003** | **4.7000e-004** | **1.0000e-005** | **4.8000e-004** | **0.0000** | **1.7035** | **1.7035** | **1.0000e-004** | **0.0000** | **1.7055** |

## 3.4 Building Construction - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.3312 | 1.9839 | 1.3804 | 2.0200e-003 | | 0.1366 | 0.1366 | | 0.1320 | 0.1320 | 0.0000 | 171.5645 | 171.5645 | 0.0396 | 0.0000 | 172.3955 |
| **Total** | **0.3312** | **1.9839** | **1.3804** | **2.0200e-003** | | **0.1366** | **0.1366** | | **0.1320** | **0.1320** | **0.0000** | **171.5645** | **171.5645** | **0.0396** | **0.0000** | **172.3955** |

## 3.4 Building Construction - 2015

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0120 | 0.1223 | 0.1497 | 2.6000e-004 | 7.3600e-003 | 2.0600e-003 | 9.4100e-003 | 2.1000e-003 | 1.8900e-003 | 3.9900e-003 | 0.0000 | 23.8356 | 23.8356 | 1.9000e-004 | 0.0000 | 23.8396 |
| Worker | 0.0111 | 0.0163 | 0.1688 | 3.4000e-004 | 0.0273 | 2.4000e-004 | 0.0275 | 7.2400e-003 | 2.2000e-004 | 7.4600e-003 | 0.0000 | 26.4463 | 26.4463 | 1.4900e-003 | 0.0000 | 26.4776 |
| **Total** | **0.0231** | **0.1386** | **0.3185** | **6.0000e-004** | **0.0346** | **2.3000e-003** | **0.0369** | **9.3400e-003** | **2.1100e-003** | **0.0115** | **0.0000** | **50.2818** | **50.2818** | **1.6800e-003** | **0.0000** | **50.3172** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.3312 | 1.9839 | 1.3804 | 2.0200e-003 | | 0.1366 | 0.1366 | | 0.1320 | 0.1320 | 0.0000 | 171.5643 | 171.5643 | 0.0396 | 0.0000 | 172.3953 |
| **Total** | **0.3312** | **1.9839** | **1.3804** | **2.0200e-003** | | **0.1366** | **0.1366** | | **0.1320** | **0.1320** | **0.0000** | **171.5643** | **171.5643** | **0.0396** | **0.0000** | **172.3953** |

## 3.4 Building Construction - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0120 | 0.1223 | 0.1497 | 2.6000e-004 | 7.3600e-003 | 2.0600e-003 | 9.4100e-003 | 2.1000e-003 | 1.8900e-003 | 3.9900e-003 | 0.0000 | 23.8356 | 23.8356 | 1.9000e-004 | 0.0000 | 23.8396 |
| Worker | 0.0111 | 0.0163 | 0.1688 | 3.4000e-004 | 0.0273 | 2.4000e-004 | 0.0275 | 7.2400e-003 | 2.2000e-004 | 7.4600e-003 | 0.0000 | 26.4463 | 26.4463 | 1.4900e-003 | 0.0000 | 26.4776 |
| **Total** | **0.0231** | **0.1386** | **0.3185** | **6.0000e-004** | **0.0346** | **2.3000e-003** | **0.0369** | **9.3400e-003** | **2.1100e-003** | **0.0115** | **0.0000** | **50.2818** | **50.2818** | **1.6800e-003** | **0.0000** | **50.3172** |

## 3.4 Building Construction - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2765 | 1.7259 | 1.2354 | 1.8400e-003 | | 0.1147 | 0.1147 | | 0.1107 | 0.1107 | 0.0000 | 155.9843 | 155.9843 | 0.0343 | 0.0000 | 156.7043 |
| **Total** | **0.2765** | **1.7259** | **1.2354** | **1.8400e-003** | | **0.1147** | **0.1147** | | **0.1107** | **0.1107** | **0.0000** | **155.9843** | **155.9843** | **0.0343** | **0.0000** | **156.7043** |

## 3.4 Building Construction - 2016

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 9.6900e-003 | 0.0986 | 0.1271 | 2.4000e-004 | 6.7200e-003 | 1.5600e-003 | 8.2800e-003 | 1.9200e-003 | 1.4300e-003 | 3.3500e-003 | 0.0000 | 21.5229 | 21.5229 | 1.6000e-004 | 0.0000 | 21.5261 |
| Worker | 9.1200e-003 | 0.0134 | 0.1392 | 3.1000e-004 | 0.0249 | 2.1000e-004 | 0.0251 | 6.6100e-003 | 1.9000e-004 | 6.8000e-003 | 0.0000 | 23.3122 | 23.3122 | 1.2600e-003 | 0.0000 | 23.3386 |
| **Total** | **0.0188** | **0.1120** | **0.2663** | **5.5000e-004** | **0.0316** | **1.7700e-003** | **0.0334** | **8.5300e-003** | **1.6200e-003** | **0.0102** | **0.0000** | **44.8351** | **44.8351** | **1.4200e-003** | **0.0000** | **44.8647** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2765 | 1.7259 | 1.2354 | 1.8400e-003 | | 0.1147 | 0.1147 | | 0.1107 | 0.1107 | 0.0000 | 155.9841 | 155.9841 | 0.0343 | 0.0000 | 156.7041 |
| **Total** | **0.2765** | **1.7259** | **1.2354** | **1.8400e-003** | | **0.1147** | **0.1147** | | **0.1107** | **0.1107** | **0.0000** | **155.9841** | **155.9841** | **0.0343** | **0.0000** | **156.7041** |

## 3.4 Building Construction - 2016

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 9.6900e-003 | 0.0986 | 0.1271 | 2.4000e-004 | 6.7200e-003 | 1.5600e-003 | 8.2800e-003 | 1.9200e-003 | 1.4300e-003 | 3.3500e-003 | 0.0000 | 21.5229 | 21.5229 | 1.6000e-004 | 0.0000 | 21.5261 |
| Worker | 9.1200e-003 | 0.0134 | 0.1392 | 3.1000e-004 | 0.0249 | 2.1000e-004 | 0.0251 | 6.6100e-003 | 1.9000e-004 | 6.8000e-003 | 0.0000 | 23.3122 | 23.3122 | 1.2600e-003 | 0.0000 | 23.3386 |
| **Total** | **0.0188** | **0.1120** | **0.2663** | **5.5000e-004** | **0.0316** | **1.7700e-003** | **0.0334** | **8.5300e-003** | **1.6200e-003** | **0.0102** | **0.0000** | **44.8351** | **44.8351** | **1.4200e-003** | **0.0000** | **44.8647** |

## 3.5 Paving - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0133 | 0.1387 | 0.0871 | 1.3000e-004 | | 8.4700e-003 | 8.4700e-003 | | 7.8000e-003 | 7.8000e-003 | 0.0000 | 11.9145 | 11.9145 | 3.4900e-003 | 0.0000 | 11.9878 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0133** | **0.1387** | **0.0871** | **1.3000e-004** | | **8.4700e-003** | **8.4700e-003** | | **7.8000e-003** | **7.8000e-003** | **0.0000** | **11.9145** | **11.9145** | **3.4900e-003** | **0.0000** | **11.9878** |

### 3.5 Paving - 2015

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.5000e-004 | 8.1000e-004 | 8.3900e-003 | 2.0000e-005 | 1.3500e-003 | 1.0000e-005 | 1.3700e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.3149 | 1.3149 | 7.0000e-005 | 0.0000 | 1.3164 |
| **Total** | **5.5000e-004** | **8.1000e-004** | **8.3900e-003** | **2.0000e-005** | **1.3500e-003** | **1.0000e-005** | **1.3700e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.3149** | **1.3149** | **7.0000e-005** | **0.0000** | **1.3164** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0133 | 0.1387 | 0.0871 | 1.3000e-004 | | 8.4700e-003 | 8.4700e-003 | | 7.8000e-003 | 7.8000e-003 | 0.0000 | 11.9145 | 11.9145 | 3.4900e-003 | 0.0000 | 11.9878 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0133** | **0.1387** | **0.0871** | **1.3000e-004** | | **8.4700e-003** | **8.4700e-003** | | **7.8000e-003** | **7.8000e-003** | **0.0000** | **11.9145** | **11.9145** | **3.4900e-003** | **0.0000** | **11.9878** |

## 3.5 Paving - 2015

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.5000e-004 | 8.1000e-004 | 8.3900e-003 | 2.0000e-005 | 1.3500e-003 | 1.0000e-005 | 1.3700e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.3149 | 1.3149 | 7.0000e-005 | 0.0000 | 1.3164 |
| **Total** | **5.5000e-004** | **8.1000e-004** | **8.3900e-003** | **2.0000e-005** | **1.3500e-003** | **1.0000e-005** | **1.3700e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.3149** | **1.3149** | **7.0000e-005** | **0.0000** | **1.3164** |

## 3.6 Architectural Coating - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9455 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.6300e-003 | 0.0427 | 0.0339 | 5.0000e-005 | | 3.5400e-003 | 3.5400e-003 | | 3.5400e-003 | 3.5400e-003 | 0.0000 | 4.5959 | 4.5959 | 5.4000e-004 | 0.0000 | 4.6072 |
| **Total** | **0.9522** | **0.0427** | **0.0339** | **5.0000e-005** | | **3.5400e-003** | **3.5400e-003** | | **3.5400e-003** | **3.5400e-003** | **0.0000** | **4.5959** | **4.5959** | **5.4000e-004** | **0.0000** | **4.6072** |

### 3.6 Architectural Coating - 2016

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.6000e-004 | 5.3000e-004 | 5.5200e-003 | 1.0000e-005 | 9.9000e-004 | 1.0000e-005 | 1.0000e-003 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 0.9251 | 0.9251 | 5.0000e-005 | 0.0000 | 0.9261 |
| **Total** | **3.6000e-004** | **5.3000e-004** | **5.5200e-003** | **1.0000e-005** | **9.9000e-004** | **1.0000e-005** | **1.0000e-003** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **0.9251** | **0.9251** | **5.0000e-005** | **0.0000** | **0.9261** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9455 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.6300e-003 | 0.0427 | 0.0339 | 5.0000e-005 | | 3.5400e-003 | 3.5400e-003 | | 3.5400e-003 | 3.5400e-003 | 0.0000 | 4.5959 | 4.5959 | 5.4000e-004 | 0.0000 | 4.6072 |
| **Total** | **0.9522** | **0.0427** | **0.0339** | **5.0000e-005** | | **3.5400e-003** | **3.5400e-003** | | **3.5400e-003** | **3.5400e-003** | **0.0000** | **4.5959** | **4.5959** | **5.4000e-004** | **0.0000** | **4.6072** |

### 3.6 Architectural Coating - 2016

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.6000e-004 | 5.3000e-004 | 5.5200e-003 | 1.0000e-005 | 9.9000e-004 | 1.0000e-005 | 1.0000e-003 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 0.9251 | 0.9251 | 5.0000e-005 | 0.0000 | 0.9261 |
| **Total** | **3.6000e-004** | **5.3000e-004** | **5.5200e-003** | **1.0000e-005** | **9.9000e-004** | **1.0000e-005** | **1.0000e-003** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **0.9251** | **0.9251** | **5.0000e-005** | **0.0000** | **0.9261** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.8421 | 4.1548 | 17.1912 | 0.0355 | 2.3722 | 0.0534 | 2.4256 | 0.6348 | 0.0492 | 0.6840 | 0.0000 | 2,746.4223 | 2,746.4223 | 0.1126 | 0.0000 | 2,748.7863 |
| Unmitigated | 1.8421 | 4.1548 | 17.1912 | 0.0355 | 2.3722 | 0.0534 | 2.4256 | 0.6348 | 0.0492 | 0.6840 | 0.0000 | 2,746.4223 | 2,746.4223 | 0.1126 | 0.0000 | 2,748.7863 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Automobile Care Center | 8.75 | 8.75 | 8.75 | 11,721 | 11,721 |
| General Office Building | 182.77 | 39.34 | 16.27 | 446,145 | 446,145 |
| Quality Restaurant | 28.31 | 28.31 | 28.31 | 40,309 | 40,309 |
| Racquet Club | 45.76 | 45.76 | 45.76 | 93,316 | 93,316 |
| Regional Shopping Center | 1,666.07 | 1,938.84 | 979.31 | 3,475,538 | 3,475,538 |
| Supermarket | 1,390.46 | 2,415.22 | 2263.58 | 2,192,419 | 2,192,419 |
| Total | 3,322.13 | 4,476.23 | 3,341.99 | 6,259,448 | 6,259,448 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Automobile Care Center | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 21 | 51 | 28 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Racquet Club | 16.60 | 8.40 | 6.90 | 11.50 | 69.50 | 19.00 | 52 | 39 | 9 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |
| Supermarket | 16.60 | 8.40 | 6.90 | 6.50 | 74.50 | 19.00 | 34 | 30 | 36 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.512163 | 0.060173 | 0.180257 | 0.139094 | 0.042244 | 0.006664 | 0.016017 | 0.031880 | 0.001940 | 0.002497 | 0.004356 | 0.000592 | 0.002122 |

### 4.4 Fleet Mix

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Install High Efficiency Lighting

Install Energy Efficient Appliances

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 527.5362 | 527.5362 | 0.0243 | 5.0200e-003 | 529.6008 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 532.1130 | 532.1130 | 0.0245 | 5.0600e-003 | 534.1955 |
| NaturalGas Mitigated | 0.0157 | 0.1428 | 0.1199 | 8.6000e-004 | | 0.0109 | 0.0109 | | 0.0109 | 0.0109 | 0.0000 | 155.4065 | 155.4065 | 2.9800e-003 | 2.8500e-003 | 156.3523 |
| NaturalGas Unmitigated | 0.0157 | 0.1428 | 0.1199 | 8.6000e-004 | | 0.0109 | 0.0109 | | 0.0109 | 0.0109 | 0.0000 | 155.4065 | 155.4065 | 2.9800e-003 | 2.8500e-003 | 156.3523 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Quality Restaurant | 2.3068e+006 | 0.0124 | 0.1131 | 0.0950 | 6.8000e-004 | | 8.5900e-003 | 8.5900e-003 | | 8.5900e-003 | 8.5900e-003 | 0.0000 | 123.0996 | 123.0996 | 2.3600e-003 | 2.2600e-003 | 123.8487 |
| Racquet Club | 37620 | 2.0000e-004 | 1.8400e-003 | 1.5500e-003 | 1.0000e-005 | | 1.4000e-004 | 1.4000e-004 | | 1.4000e-004 | 1.4000e-004 | 0.0000 | 2.0076 | 2.0076 | 4.0000e-005 | 4.0000e-005 | 2.0198 |
| Regional Shopping Center | 65960 | 3.6000e-004 | 3.2300e-003 | 2.7200e-003 | 2.0000e-005 | | 2.5000e-004 | 2.5000e-004 | | 2.5000e-004 | 2.5000e-004 | 0.0000 | 3.5199 | 3.5199 | 7.0000e-005 | 6.0000e-005 | 3.5413 |
| Supermarket | 307224 | 1.6600e-003 | 0.0151 | 0.0127 | 9.0000e-005 | | 1.1400e-003 | 1.1400e-003 | | 1.1400e-003 | 1.1400e-003 | 0.0000 | 16.3946 | 16.3946 | 3.1000e-004 | 3.0000e-004 | 16.4944 |
| Automobile Care Center | 13167 | 7.0000e-005 | 6.5000e-004 | 5.4000e-004 | 0.0000 | | 5.0000e-005 | 5.0000e-005 | | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.7026 | 0.7026 | 1.0000e-005 | 1.0000e-005 | 0.7069 |
| General Office Building | 181438 | 9.8000e-004 | 8.8900e-003 | 7.4700e-003 | 5.0000e-005 | | 6.8000e-004 | 6.8000e-004 | | 6.8000e-004 | 6.8000e-004 | 0.0000 | 9.6822 | 9.6822 | 1.9000e-004 | 1.8000e-004 | 9.7412 |
| **Total** | | **0.0157** | **0.1428** | **0.1199** | **8.5000e-004** | | **0.0109** | **0.0109** | | **0.0109** | **0.0109** | **0.0000** | **155.4065** | **155.4065** | **2.9800e-003** | **2.8500e-003** | **156.3523** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Racquet Club | 37620 | 2.0000e-004 | 1.8400e-003 | 1.5500e-003 | 1.0000e-005 | | 1.4000e-004 | 1.4000e-004 | | 1.4000e-004 | 1.4000e-004 | 0.0000 | 2.0076 | 2.0076 | 4.0000e-005 | 4.0000e-005 | 2.0198 |
| Regional Shopping Center | 65960 | 3.6000e-004 | 3.2300e-003 | 2.7200e-003 | 2.0000e-005 | | 2.5000e-004 | 2.5000e-004 | | 2.5000e-004 | 2.5000e-004 | 0.0000 | 3.5199 | 3.5199 | 7.0000e-005 | 6.0000e-005 | 3.5413 |
| Supermarket | 307224 | 1.6600e-003 | 0.0151 | 0.0127 | 9.0000e-005 | | 1.1400e-003 | 1.1400e-003 | | 1.1400e-003 | 1.1400e-003 | 0.0000 | 16.3946 | 16.3946 | 3.1000e-004 | 3.0000e-004 | 16.4944 |
| Automobile Care Center | 13167 | 7.0000e-005 | 6.5000e-004 | 5.4000e-004 | 0.0000 | | 5.0000e-005 | 5.0000e-005 | | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.7026 | 0.7026 | 1.0000e-005 | 1.0000e-005 | 0.7069 |
| General Office Building | 181438 | 9.8000e-004 | 8.8900e-003 | 7.4700e-003 | 5.0000e-005 | | 6.8000e-004 | 6.8000e-004 | | 6.8000e-004 | 6.8000e-004 | 0.0000 | 9.6822 | 9.6822 | 1.9000e-004 | 1.8000e-004 | 9.7412 |
| Quality Restaurant | 2.3068e+006 | 0.0124 | 0.1131 | 0.0950 | 6.8000e-004 | | 8.5900e-003 | 8.5900e-003 | | 8.5900e-003 | 8.5900e-003 | 0.0000 | 123.0996 | 123.0996 | 2.3600e-003 | 2.2600e-003 | 123.8487 |
| **Total** | | **0.0157** | **0.1428** | **0.1199** | **8.5000e-004** | | **0.0109** | **0.0109** | | **0.0109** | **0.0109** | **0.0000** | **155.4065** | **155.4065** | **2.9800e-003** | **2.8500e-003** | **156.3523** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Automobile Care Center | 8435 | 2.4138 | 1.1000e-004 | 2.0000e-005 | 2.4233 |
| General Office Building | 241198 | 69.0229 | 3.1700e-003 | 6.6000e-004 | 69.2930 |
| Quality Restaurant | 464409 | 132.8985 | 6.1100e-003 | 1.2600e-003 | 133.4186 |
| Racquet Club | 24100 | 6.8966 | 3.2000e-004 | 7.0000e-005 | 6.9236 |
| Regional Shopping Center | 588596 | 168.4367 | 7.7400e-003 | 1.6000e-003 | 169.0959 |
| Supermarket | 532712 | 152.4445 | 7.0100e-003 | 1.4500e-003 | 153.0411 |
| **Total** | | **532.1130** | **0.0245** | **5.0600e-003** | **534.1955** |

### 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Automobile Care Center | 8435 | 2.4138 | 1.1000e-004 | 2.0000e-005 | 2.4233 |
| General Office Building | 241198 | 69.0229 | 3.1700e-003 | 6.6000e-004 | 69.2930 |
| Quality Restaurant | 448416 | 128.3217 | 5.9000e-003 | 1.2200e-003 | 128.8239 |
| Racquet Club | 24100 | 6.8966 | 3.2000e-004 | 7.0000e-005 | 6.9236 |
| Regional Shopping Center | 588596 | 168.4367 | 7.7400e-003 | 1.6000e-003 | 169.0959 |
| Supermarket | 532712 | 152.4445 | 7.0100e-003 | 1.4500e-003 | 153.0411 |
| **Total** | | **527.5362** | **0.0243** | **5.0200e-003** | **529.6007** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.3895 | 1.0000e-005 | 1.0600e-003 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0300e-003 | 2.0300e-003 | 1.0000e-005 | 0.0000 | 2.1400e-003 |
| Unmitigated | 0.3895 | 1.0000e-005 | 1.0600e-003 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0300e-003 | 2.0300e-003 | 1.0000e-005 | 0.0000 | 2.1400e-003 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0946 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.2949 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 1.0000e-004 | 1.0000e-005 | 1.0600e-003 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0300e-003 | 2.0300e-003 | 1.0000e-005 | 0.0000 | 2.1400e-003 |
| **Total** | **0.3895** | **1.0000e-005** | **1.0600e-003** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **2.0300e-003** | **2.0300e-003** | **1.0000e-005** | **0.0000** | **2.1400e-003** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0946 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.2949 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 1.0000e-004 | 1.0000e-005 | 1.0600e-003 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0300e-003 | 2.0300e-003 | 1.0000e-005 | 0.0000 | 2.1400e-003 |
| **Total** | **0.3895** | **1.0000e-005** | **1.0600e-003** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **2.0300e-003** | **2.0300e-003** | **1.0000e-005** | **0.0000** | **2.1400e-003** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 47.0623 | 0.2807 | 6.9900e-003 | 55.1233 |
| Unmitigated | 55.7071 | 0.3507 | 8.7200e-003 | 65.7766 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Automobile Care Center | 0.0658568 / 0.0403638 | 0.3946 | 2.1600e-003 | 5.0000e-005 | 0.4569 |
| General Office Building | 2.95038 / 1.8083 | 17.6788 | 0.0969 | 2.4300e-003 | 20.4670 |
| Quality Restaurant | 3.00498 / 0.191807 | 12.7603 | 0.0985 | 2.4200e-003 | 15.5795 |
| Racquet Club | 0.118286 / 0.0724981 | 0.7088 | 3.8900e-003 | 1.0000e-004 | 0.8206 |
| Regional Shopping Center | 2.87401 / 1.76149 | 17.2212 | 0.0944 | 2.3700e-003 | 19.9372 |
| Supermarket | 1.67645 / 0.0518489 | 6.9435 | 0.0549 | 1.3500e-003 | 8.5156 |
| **Total** | | **55.7072** | **0.3507** | **8.7200e-003** | **65.7766** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Automobile Care Center | 0.0526854 / 0.0403638 | 0.3414 | 1.7300e-003 | 4.0000e-005 | 0.3912 |
| General Office Building | 2.3603 / 1.8083 | 15.2929 | 0.0776 | 1.9500e-003 | 17.5267 |
| Quality Restaurant | 2.40399 / 0.191807 | 10.3302 | 0.0788 | 1.9400e-003 | 12.5848 |
| Racquet Club | 0.094629 / 0.0724981 | 0.6131 | 3.1100e-003 | 8.0000e-005 | 0.7027 |
| Regional Shopping Center | 2.29921 / 1.76149 | 14.8970 | 0.0756 | 1.9000e-003 | 17.0730 |
| Supermarket | 1.34116 / 0.0518489 | 5.5877 | 0.0439 | 1.0800e-003 | 6.8449 |
| **Total** | | **47.0623** | **0.2807** | **6.9900e-003** | **55.1233** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 25.3300 | 1.4970 | 0.0000 | 56.7662 |
| Unmitigated | 31.6625 | 1.8712 | 0.0000 | 70.9578 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Automobile Care Center | 2.67 | 0.5420 | 0.0320 | 0.0000 | 1.2146 |
| General Office Building | 15.44 | 3.1342 | 0.1852 | 0.0000 | 7.0239 |
| Quality Restaurant | 9.03 | 1.8330 | 0.1083 | 0.0000 | 4.1079 |
| Racquet Club | 11.4 | 2.3141 | 0.1368 | 0.0000 | 5.1860 |
| Regional Shopping Center | 40.74 | 8.2699 | 0.4887 | 0.0000 | 18.5333 |
| Supermarket | 76.7 | 15.5694 | 0.9201 | 0.0000 | 34.8920 |
| **Total** | | **31.6625** | **1.8712** | **0.0000** | **70.9578** |

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Automobile Care Center | 2.136 | 0.4336 | 0.0256 | 0.0000 | 0.9717 |
| General Office Building | 12.352 | 2.5073 | 0.1482 | 0.0000 | 5.6191 |
| Quality Restaurant | 7.224 | 1.4664 | 0.0867 | 0.0000 | 3.2863 |
| Racquet Club | 9.12 | 1.8513 | 0.1094 | 0.0000 | 4.1488 |
| Regional Shopping Center | 32.592 | 6.6159 | 0.3910 | 0.0000 | 14.8266 |
| Supermarket | 61.36 | 12.4555 | 0.7361 | 0.0000 | 27.9136 |
| **Total** | | **25.3300** | **1.4970** | **0.0000** | **56.7662** |

# 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

# 10.0 Vegetation

# Parcel 44 Existing

## South Coast Air Basin, Summer

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 4.20 | 1000sqft | 0.10 | 4,200.00 | 0 |
| Racquet Club | 1.10 | 1000sqft | 0.03 | 1,100.00 | 0 |
| Automobile Care Center | 1.60 | 1000sqft | 0.04 | 1,600.00 | 0 |
| Regional Shopping Center | 7.90 | 1000sqft | 0.18 | 7,900.00 | 0 |

### 1.2 Other Project Characteristics

**Urbanization** Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 31

**Climate Zone** 11 **Operational Year** 2013

**Utility Company** Southern California Edison

**CO2 Intensity (lb/MWhr)** 630.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trips for auto care and raquet club modified to match modified to trips estimated for proposed project.

Mobile Land Use Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblProjectCharacteristics | OperationalYear | 2014 | 2013 |

# 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2014 | 69.0494 | 15.0904 | 9.6469 | 0.0137 | 0.8645 | 1.0384 | 1.7960 | 0.4434 | 0.9553 | 1.3347 | 0.0000 | 1,334.5361 | 1,334.5361 | 0.3599 | 0.0000 | 1,342.0943 |
| **Total** | **69.0494** | **15.0904** | **9.6469** | **0.0137** | **0.8645** | **1.0384** | **1.7960** | **0.4434** | **0.9553** | **1.3347** | **0.0000** | **1,334.5361** | **1,334.5361** | **0.3599** | **0.0000** | **1,342.0943** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2014 | 69.0494 | 15.0904 | 9.6469 | 0.0137 | 0.8645 | 1.0384 | 1.7960 | 0.4434 | 0.9553 | 1.3347 | 0.0000 | 1,334.5361 | 1,334.5361 | 0.3599 | 0.0000 | 1,342.0943 |
| **Total** | **69.0494** | **15.0904** | **9.6469** | **0.0137** | **0.8645** | **1.0384** | **1.7960** | **0.4434** | **0.9553** | **1.3347** | **0.0000** | **1,334.5361** | **1,334.5361** | **0.3599** | **0.0000** | **1,342.0943** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.3872 | 2.0000e-005 | 1.6000e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 3.2400e-003 | 3.2400e-003 | 1.0000e-005 | | 3.4500e-003 |
| Energy | 3.2500e-003 | 0.0296 | 0.0249 | 1.8000e-004 | | 2.2500e-003 | 2.2500e-003 | | 2.2500e-003 | 2.2500e-003 | | 35.4949 | 35.4949 | 6.8000e-004 | 6.5000e-004 | 35.7109 |
| Mobile | 2.4604 | 5.4225 | 23.7069 | 0.0384 | 2.5624 | 0.1047 | 2.6671 | 0.6844 | 0.0961 | 0.7805 | | 3,629.4346 | 3,629.4346 | 0.1806 | | 3,633.2275 |
| **Total** | **2.8508** | **5.4521** | **23.7334** | **0.0386** | **2.5624** | **0.1070** | **2.6694** | **0.6844** | **0.0984** | **0.7828** | | **3,664.9327** | **3,664.9327** | **0.1813** | **6.5000e-004** | **3,668.9419** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.3872 | 2.0000e-005 | 1.6000e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 3.2400e-003 | 3.2400e-003 | 1.0000e-005 | | 3.4500e-003 |
| Energy | 3.2500e-003 | 0.0296 | 0.0249 | 1.8000e-004 | | 2.2500e-003 | 2.2500e-003 | | 2.2500e-003 | 2.2500e-003 | | 35.4949 | 35.4949 | 6.8000e-004 | 6.5000e-004 | 35.7109 |
| Mobile | 2.4604 | 5.4225 | 23.7069 | 0.0384 | 2.5624 | 0.1047 | 2.6671 | 0.6844 | 0.0961 | 0.7805 | | 3,629.4346 | 3,629.4346 | 0.1806 | | 3,633.2275 |
| **Total** | **2.8508** | **5.4521** | **23.7334** | **0.0386** | **2.5624** | **0.1070** | **2.6694** | **0.6844** | **0.0984** | **0.7828** | | **3,664.9327** | **3,664.9327** | **0.1813** | **6.5000e-004** | **3,668.9419** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 1/1/2014 | 1/14/2014 | 5 | 10 | |
| 2 | Site Preparation | Site Preparation | 1/15/2014 | 1/15/2014 | 5 | 1 | |
| 3 | Grading | Grading | 1/16/2014 | 1/17/2014 | 5 | 2 | |
| 4 | Building Construction | Building Construction | 1/18/2014 | 6/6/2014 | 5 | 100 | |
| 5 | Paving | Paving | 6/7/2014 | 6/13/2014 | 5 | 5 | |
| 6 | Architectural Coating | Architectural Coating | 6/14/2014 | 6/20/2014 | 5 | 5 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 22,200; Non-Residential Outdoor: 7,400 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Rubber Tired Dozers | 1 | 1.00 | 255 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 174 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Rubber Tired Dozers | 1 | 1.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 4.00 | 226 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 7.00 | 125 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 5 | 5.00 | 2.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 1.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4929 | 12.4922 | 8.8528 | 0.0121 | | 0.9304 | 0.9304 | | 0.8904 | 0.8904 | | 1,207.2469 | 1,207.2469 | 0.2515 | | 1,212.5281 |
| **Total** | **1.4929** | **12.4922** | **8.8528** | **0.0121** | | **0.9304** | **0.9304** | | **0.8904** | **0.8904** | | **1,207.2469** | **1,207.2469** | **0.2515** | | **1,212.5281** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0513 | 0.0643 | 0.7942 | 1.4200e-003 | 0.1118 | 1.0500e-003 | 0.1128 | 0.0296 | 9.6000e-004 | 0.0306 | | 127.2893 | 127.2893 | 7.2400e-003 | | 127.4413 |
| **Total** | **0.0513** | **0.0643** | **0.7942** | **1.4200e-003** | **0.1118** | **1.0500e-003** | **0.1128** | **0.0296** | **9.6000e-004** | **0.0306** | | **127.2893** | **127.2893** | **7.2400e-003** | | **127.4413** |

## 3.2 Demolition - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4929 | 12.4922 | 8.8528 | 0.0121 | | 0.9304 | 0.9304 | | 0.8904 | 0.8904 | 0.0000 | 1,207.2469 | 1,207.2469 | 0.2515 | | 1,212.5281 |
| **Total** | **1.4929** | **12.4922** | **8.8528** | **0.0121** | | **0.9304** | **0.9304** | | **0.8904** | **0.8904** | **0.0000** | **1,207.2469** | **1,207.2469** | **0.2515** | | **1,212.5281** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0513 | 0.0643 | 0.7942 | 1.4200e-003 | 0.1118 | 1.0500e-003 | 0.1128 | 0.0296 | 9.6000e-004 | 0.0306 | | 127.2893 | 127.2893 | 7.2400e-003 | | 127.4413 |
| **Total** | **0.0513** | **0.0643** | **0.7942** | **1.4200e-003** | **0.1118** | **1.0500e-003** | **0.1128** | **0.0296** | **9.6000e-004** | **0.0306** | | **127.2893** | **127.2893** | **7.2400e-003** | | **127.4413** |

## 3.3 Site Preparation - 2014

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.4341 | 14.4817 | 7.3936 | 9.3700e-003 | | 0.8920 | 0.8920 | | 0.8206 | 0.8206 | | 995.1971 | 995.1971 | 0.2941 | | 1,001.3730 |
| **Total** | **1.4341** | **14.4817** | **7.3936** | **9.3700e-003** | **0.5303** | **0.8920** | **1.4223** | **0.0573** | **0.8206** | **0.8779** | | **995.1971** | **995.1971** | **0.2941** | | **1,001.3730** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0257 | 0.0322 | 0.3971 | 7.1000e-004 | 0.0559 | 5.3000e-004 | 0.0564 | 0.0148 | 4.8000e-004 | 0.0153 | | 63.6446 | 63.6446 | 3.6200e-003 | | 63.7206 |
| **Total** | **0.0257** | **0.0322** | **0.3971** | **7.1000e-004** | **0.0559** | **5.3000e-004** | **0.0564** | **0.0148** | **4.8000e-004** | **0.0153** | | **63.6446** | **63.6446** | **3.6200e-003** | | **63.7206** |

## 3.3 Site Preparation - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.4341 | 14.4817 | 7.3936 | 9.3700e-003 | | 0.8920 | 0.8920 | | 0.8206 | 0.8206 | 0.0000 | 995.1971 | 995.1971 | 0.2941 | | 1,001.3730 |
| **Total** | **1.4341** | **14.4817** | **7.3936** | **9.3700e-003** | **0.5303** | **0.8920** | **1.4223** | **0.0573** | **0.8206** | **0.8779** | **0.0000** | **995.1971** | **995.1971** | **0.2941** | | **1,001.3730** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0257 | 0.0322 | 0.3971 | 7.1000e-004 | 0.0559 | 5.3000e-004 | 0.0564 | 0.0148 | 4.8000e-004 | 0.0153 | | 63.6446 | 63.6446 | 3.6200e-003 | | 63.7206 |
| **Total** | **0.0257** | **0.0322** | **0.3971** | **7.1000e-004** | **0.0559** | **5.3000e-004** | **0.0564** | **0.0148** | **4.8000e-004** | **0.0153** | | **63.6446** | **63.6446** | **3.6200e-003** | | **63.7206** |

## 3.4 Grading - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.7528 | 0.0000 | 0.7528 | 0.4138 | 0.0000 | 0.4138 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.4929 | 12.4922 | 8.8528 | 0.0121 | | 0.9304 | 0.9304 | | 0.8904 | 0.8904 | | 1,207.246 9 | 1,207.246 9 | 0.2515 | | 1,212.528 1 |
| **Total** | **1.4929** | **12.4922** | **8.8528** | **0.0121** | **0.7528** | **0.9304** | **1.6832** | **0.4138** | **0.8904** | **1.3041** | | **1,207.246 9** | **1,207.246 9** | **0.2515** | | **1,212.528 1** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0513 | 0.0643 | 0.7942 | 1.4200e-003 | 0.1118 | 1.0500e-003 | 0.1128 | 0.0296 | 9.6000e-004 | 0.0306 | | 127.2893 | 127.2893 | 7.2400e-003 | | 127.4413 |
| **Total** | **0.0513** | **0.0643** | **0.7942** | **1.4200e-003** | **0.1118** | **1.0500e-003** | **0.1128** | **0.0296** | **9.6000e-004** | **0.0306** | | **127.2893** | **127.2893** | **7.2400e-003** | | **127.4413** |

## 3.4 Grading - 2014

**Mitigated Construction On-Site**

| Category | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.7528 | 0.0000 | 0.7528 | 0.4138 | 0.0000 | 0.4138 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.4929 | 12.4922 | 8.8528 | 0.0121 | | 0.9304 | 0.9304 | | 0.8904 | 0.8904 | 0.0000 | 1,207.2469 | 1,207.2469 | 0.2515 | | 1,212.5281 |
| **Total** | **1.4929** | **12.4922** | **8.8528** | **0.0121** | **0.7528** | **0.9304** | **1.6832** | **0.4138** | **0.8904** | **1.3041** | **0.0000** | **1,207.2469** | **1,207.2469** | **0.2515** | | **1,212.5281** |

**Mitigated Construction Off-Site**

| Category | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0513 | 0.0643 | 0.7942 | 1.4200e-003 | 0.1118 | 1.0500e-003 | 0.1128 | 0.0296 | 9.6000e-004 | 0.0306 | | 127.2893 | 127.2893 | 7.2400e-003 | | 127.4413 |
| **Total** | **0.0513** | **0.0643** | **0.7942** | **1.4200e-003** | **0.1118** | **1.0500e-003** | **0.1128** | **0.0296** | **9.6000e-004** | **0.0306** | | **127.2893** | **127.2893** | **7.2400e-003** | | **127.4413** |

## 3.5 Building Construction - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4930 | 14.8331 | 8.3419 | 0.0113 | | 1.0334 | 1.0334 | | 0.9507 | 0.9507 | | 1,204.3497 | 1,204.3497 | 0.3559 | | 1,211.8235 |
| **Total** | **1.4930** | **14.8331** | **8.3419** | **0.0113** | | **1.0334** | **1.0334** | | **0.9507** | **0.9507** | | **1,204.3497** | **1,204.3497** | **0.3559** | | **1,211.8235** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0219 | 0.2251 | 0.2401 | 4.4000e-004 | 0.0125 | 4.4300e-003 | 0.0169 | 3.5600e-003 | 4.0700e-003 | 7.6300e-003 | | 44.6173 | 44.6173 | 3.9000e-004 | | 44.6256 |
| Worker | 0.0257 | 0.0322 | 0.3971 | 7.1000e-004 | 0.0559 | 5.3000e-004 | 0.0564 | 0.0148 | 4.8000e-004 | 0.0153 | | 63.6446 | 63.6446 | 3.6200e-003 | | 63.7206 |
| **Total** | **0.0476** | **0.2573** | **0.6371** | **1.1500e-003** | **0.0684** | **4.9600e-003** | **0.0733** | **0.0184** | **4.5500e-003** | **0.0229** | | **108.2620** | **108.2620** | **4.0100e-003** | | **108.3463** |

## 3.5 Building Construction - 2014

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4930 | 14.8331 | 8.3419 | 0.0113 | | 1.0334 | 1.0334 | | 0.9507 | 0.9507 | 0.0000 | 1,204.3497 | 1,204.3497 | 0.3559 | | 1,211.8235 |
| **Total** | **1.4930** | **14.8331** | **8.3419** | **0.0113** | | **1.0334** | **1.0334** | | **0.9507** | **0.9507** | **0.0000** | **1,204.3497** | **1,204.3497** | **0.3559** | | **1,211.8235** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0219 | 0.2251 | 0.2401 | 4.4000e-004 | 0.0125 | 4.4300e-003 | 0.0169 | 3.5600e-003 | 4.0700e-003 | 7.6300e-003 | | 44.6173 | 44.6173 | 3.9000e-004 | | 44.6256 |
| Worker | 0.0257 | 0.0322 | 0.3971 | 7.1000e-004 | 0.0559 | 5.3000e-004 | 0.0564 | 0.0148 | 4.8000e-004 | 0.0153 | | 63.6446 | 63.6446 | 3.6200e-003 | | 63.7206 |
| **Total** | **0.0476** | **0.2573** | **0.6371** | **1.1500e-003** | **0.0684** | **4.9600e-003** | **0.0733** | **0.0184** | **4.5500e-003** | **0.0229** | | **108.2620** | **108.2620** | **4.0100e-003** | | **108.3463** |

## 3.6 Paving - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2331 | 11.8542 | 7.3554 | 0.0111 | | 0.7457 | 0.7457 | | 0.6898 | 0.6898 | | 1,103.2826 | 1,103.2826 | 0.2973 | | 1,109.5248 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.2331** | **11.8542** | **7.3554** | **0.0111** | | **0.7457** | **0.7457** | | **0.6898** | **0.6898** | | **1,103.2826** | **1,103.2826** | **0.2973** | | **1,109.5248** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0924 | 0.1157 | 1.4295 | 2.5500e-003 | 0.2012 | 1.9000e-003 | 0.2031 | 0.0534 | 1.7300e-003 | 0.0551 | | 229.1207 | 229.1207 | 0.0130 | | 229.3943 |
| **Total** | **0.0924** | **0.1157** | **1.4295** | **2.5500e-003** | **0.2012** | **1.9000e-003** | **0.2031** | **0.0534** | **1.7300e-003** | **0.0551** | | **229.1207** | **229.1207** | **0.0130** | | **229.3943** |

## 3.6 Paving - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2331 | 11.8542 | 7.3554 | 0.0111 | | 0.7457 | 0.7457 | | 0.6898 | 0.6898 | 0.0000 | 1,103.2826 | 1,103.2826 | 0.2973 | | 1,109.5248 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.2331** | **11.8542** | **7.3554** | **0.0111** | | **0.7457** | **0.7457** | | **0.6898** | **0.6898** | **0.0000** | **1,103.2826** | **1,103.2826** | **0.2973** | | **1,109.5248** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0924 | 0.1157 | 1.4295 | 2.5500e-003 | 0.2012 | 1.9000e-003 | 0.2031 | 0.0534 | 1.7300e-003 | 0.0551 | | 229.1207 | 229.1207 | 0.0130 | | 229.3943 |
| **Total** | **0.0924** | **0.1157** | **1.4295** | **2.5500e-003** | **0.2012** | **1.9000e-003** | **0.2031** | **0.0534** | **1.7300e-003** | **0.0551** | | **229.1207** | **229.1207** | **0.0130** | | **229.3943** |

## 3.7 Architectural Coating - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 68.5980 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.4462 | 2.7773 | 1.9216 | 2.9700e-003 | | 0.2452 | 0.2452 | | 0.2452 | 0.2452 | | 281.4481 | 281.4481 | 0.0401 | | 282.2905 |
| **Total** | **69.0442** | **2.7773** | **1.9216** | **2.9700e-003** | | **0.2452** | **0.2452** | | **0.2452** | **0.2452** | | **281.4481** | **281.4481** | **0.0401** | | **282.2905** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 5.1300e-003 | 6.4300e-003 | 0.0794 | 1.4000e-004 | 0.0112 | 1.1000e-004 | 0.0113 | 2.9600e-003 | 1.0000e-004 | 3.0600e-003 | | 12.7289 | 12.7289 | 7.2000e-004 | | 12.7441 |
| **Total** | **5.1300e-003** | **6.4300e-003** | **0.0794** | **1.4000e-004** | **0.0112** | **1.1000e-004** | **0.0113** | **2.9600e-003** | **1.0000e-004** | **3.0600e-003** | | **12.7289** | **12.7289** | **7.2000e-004** | | **12.7441** |

## 3.7 Architectural Coating - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 68.5980 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.4462 | 2.7773 | 1.9216 | 2.9700e-003 | | 0.2452 | 0.2452 | | 0.2452 | 0.2452 | 0.0000 | 281.4481 | 281.4481 | 0.0401 | | 282.2905 |
| **Total** | **69.0442** | **2.7773** | **1.9216** | **2.9700e-003** | | **0.2452** | **0.2452** | | **0.2452** | **0.2452** | **0.0000** | **281.4481** | **281.4481** | **0.0401** | | **282.2905** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 5.1300e-003 | 6.4300e-003 | 0.0794 | 1.4000e-004 | 0.0112 | 1.1000e-004 | 0.0113 | 2.9600e-003 | 1.0000e-004 | 3.0600e-003 | | 12.7289 | 12.7289 | 7.2000e-004 | | 12.7441 |
| **Total** | **5.1300e-003** | **6.4300e-003** | **0.0794** | **1.4000e-004** | **0.0112** | **1.1000e-004** | **0.0113** | **2.9600e-003** | **1.0000e-004** | **3.0600e-003** | | **12.7289** | **12.7289** | **7.2000e-004** | | **12.7441** |

## 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 2.4604 | 5.4225 | 23.7069 | 0.0384 | 2.5624 | 0.1047 | 2.6671 | 0.6844 | 0.0961 | 0.7805 | | 3,629.4346 | 3,629.4346 | 0.1806 | | 3,633.2275 |
| Unmitigated | 2.4604 | 5.4225 | 23.7069 | 0.0384 | 2.5624 | 0.1047 | 2.6671 | 0.6844 | 0.0961 | 0.7805 | | 3,629.4346 | 3,629.4346 | 0.1806 | | 3,633.2275 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Automobile Care Center | 99.20 | 99.20 | 99.20 | 132,884 | 132,884 |
| General Office Building | 46.24 | 9.95 | 4.12 | 112,880 | 112,880 |
| Racquet Club | 36.22 | 22.96 | 29.40 | 68,016 | 68,016 |
| Regional Shopping Center | 339.23 | 394.76 | 199.40 | 707,648 | 707,648 |
| Total | 520.89 | 526.87 | 332.12 | 1,021,428 | 1,021,428 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Automobile Care Center | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 21 | 51 | 28 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| Racquet Club | 16.60 | 8.40 | 6.90 | 11.50 | 69.50 | 19.00 | 52 | 39 | 9 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.517496 | 0.060616 | 0.179855 | 0.141540 | 0.041435 | 0.006630 | 0.014687 | 0.026300 | 0.001931 | 0.002544 | 0.004287 | 0.000607 | 0.002072 |

## 5.0 Energy Detail

### 4.4 Fleet Mix

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 3.2500e-003 | 0.0296 | 0.0249 | 1.8000e-004 | | 2.2500e-003 | 2.2500e-003 | | 2.2500e-003 | 2.2500e-003 | | 35.4949 | 35.4949 | 6.8000e-004 | 6.5000e-004 | 35.7109 |
| NaturalGas Unmitigated | 3.2500e-003 | 0.0296 | 0.0249 | 1.8000e-004 | | 2.2500e-003 | 2.2500e-003 | | 2.2500e-003 | 2.2500e-003 | | 35.4949 | 35.4949 | 6.8000e-004 | 6.5000e-004 | 35.7109 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| General Office Building | 125.77 | 1.3600e-003 | 0.0123 | 0.0104 | 7.0000e-005 | | 9.4000e-004 | 9.4000e-004 | | 9.4000e-004 | 9.4000e-004 | | 14.7965 | 14.7965 | 2.8000e-004 | 2.7000e-004 | 14.8865 |
| Racquet Club | 56.6877 | 6.1000e-004 | 5.5600e-003 | 4.6700e-003 | 3.0000e-005 | | 4.2000e-004 | 4.2000e-004 | | 4.2000e-004 | 4.2000e-004 | | 6.6691 | 6.6691 | 1.3000e-004 | 1.2000e-004 | 6.7097 |
| Regional Shopping Center | 36.7945 | 4.0000e-004 | 3.6100e-003 | 3.0300e-003 | 2.0000e-005 | | 2.7000e-004 | 2.7000e-004 | | 2.7000e-004 | 2.7000e-004 | | 4.3288 | 4.3288 | 8.0000e-005 | 8.0000e-005 | 4.3551 |
| Automobile Care Center | 82.4548 | 8.9000e-004 | 8.0800e-003 | 6.7900e-003 | 5.0000e-005 | | 6.1000e-004 | 6.1000e-004 | | 6.1000e-004 | 6.1000e-004 | | 9.7006 | 9.7006 | 1.9000e-004 | 1.8000e-004 | 9.7596 |
| **Total** | | **3.2600e-003** | **0.0296** | **0.0249** | **1.7000e-004** | | **2.2400e-003** | **2.2400e-003** | | **2.2400e-003** | **2.2400e-003** | | **35.4949** | **35.4949** | **6.8000e-004** | **6.5000e-004** | **35.7109** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| General Office Building | 0.12577 | 1.3600e-003 | 0.0123 | 0.0104 | 7.0000e-005 | | 9.4000e-004 | 9.4000e-004 | | 9.4000e-004 | 9.4000e-004 | | 14.7965 | 14.7965 | 2.8000e-004 | 2.7000e-004 | 14.8865 |
| Racquet Club | 0.0566877 | 6.1000e-004 | 5.5600e-003 | 4.6700e-003 | 3.0000e-005 | | 4.2000e-004 | 4.2000e-004 | | 4.2000e-004 | 4.2000e-004 | | 6.6691 | 6.6691 | 1.3000e-004 | 1.2000e-004 | 6.7097 |
| Regional Shopping Center | 0.0367945 | 4.0000e-004 | 3.6100e-003 | 3.0300e-003 | 2.0000e-005 | | 2.7000e-004 | 2.7000e-004 | | 2.7000e-004 | 2.7000e-004 | | 4.3288 | 4.3288 | 8.0000e-005 | 8.0000e-005 | 4.3551 |
| Automobile Care Center | 0.0824548 | 8.9000e-004 | 8.0800e-003 | 6.7900e-003 | 5.0000e-005 | | 6.1000e-004 | 6.1000e-004 | | 6.1000e-004 | 6.1000e-004 | | 9.7006 | 9.7006 | 1.9000e-004 | 1.8000e-004 | 9.7596 |
| **Total** | | **3.2600e-003** | **0.0296** | **0.0249** | **1.7000e-004** | | **2.2400e-003** | **2.2400e-003** | | **2.2400e-003** | **2.2400e-003** | | **35.4949** | **35.4949** | **6.8000e-004** | **6.5000e-004** | **35.7109** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.3872 | 2.0000e-005 | 1.6000e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 3.2400e-003 | 3.2400e-003 | 1.0000e-005 | | 3.4500e-003 |
| Unmitigated | 0.3872 | 2.0000e-005 | 1.6000e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 3.2400e-003 | 3.2400e-003 | 1.0000e-005 | | 3.4500e-003 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0940 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.2930 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.7000e-004 | 2.0000e-005 | 1.6000e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 3.2400e-003 | 3.2400e-003 | 1.0000e-005 | | 3.4500e-003 |
| **Total** | **0.3872** | **2.0000e-005** | **1.6000e-003** | **0.0000** | | **1.0000e-005** | **1.0000e-005** | | **1.0000e-005** | **1.0000e-005** | | **3.2400e-003** | **3.2400e-003** | **1.0000e-005** | | **3.4500e-003** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0940 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.2930 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.7000e-004 | 2.0000e-005 | 1.6000e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 3.2400e-003 | 3.2400e-003 | 1.0000e-005 | | 3.4500e-003 |
| **Total** | **0.3872** | **2.0000e-005** | **1.6000e-003** | **0.0000** | | **1.0000e-005** | **1.0000e-005** | | **1.0000e-005** | **1.0000e-005** | | **3.2400e-003** | **3.2400e-003** | **1.0000e-005** | | **3.4500e-003** |

# 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Vegetation

# Parcel 44 Existing

### South Coast Air Basin, Annual

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 4.20 | 1000sqft | 0.10 | 4,200.00 | 0 |
| Racquet Club | 1.10 | 1000sqft | 0.03 | 1,100.00 | 0 |
| Automobile Care Center | 1.60 | 1000sqft | 0.04 | 1,600.00 | 0 |
| Regional Shopping Center | 7.90 | 1000sqft | 0.18 | 7,900.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 11 | | | **Operational Year** | 2013 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 630.89 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trips for auto care and raquet club modified to match modified to trips estimated for proposed project.

Mobile Land Use Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblProjectCharacteristics | OperationalYear | 2014 | 2013 |

# 2.0 Emissions Summary

## 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2014 | 0.2630 | 0.8748 | 0.5380 | 7.5000e-004 | 5.5800e-003 | 0.0604 | 0.0660 | 1.6700e-003 | 0.0559 | 0.0575 | 0.0000 | 70.7688 | 70.7688 | 0.0187 | 0.0000 | 71.1607 |
| **Total** | **0.2630** | **0.8748** | **0.5380** | **7.5000e-004** | **5.5800e-003** | **0.0604** | **0.0660** | **1.6700e-003** | **0.0559** | **0.0575** | **0.0000** | **70.7688** | **70.7688** | **0.0187** | **0.0000** | **71.1607** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2014 | 0.2630 | 0.8748 | 0.5380 | 7.5000e-004 | 5.5800e-003 | 0.0604 | 0.0660 | 1.6700e-003 | 0.0559 | 0.0575 | 0.0000 | 70.7687 | 70.7687 | 0.0187 | 0.0000 | 71.1607 |
| **Total** | **0.2630** | **0.8748** | **0.5380** | **7.5000e-004** | **5.5800e-003** | **0.0604** | **0.0660** | **1.6700e-003** | **0.0559** | **0.0575** | **0.0000** | **70.7687** | **70.7687** | **0.0187** | **0.0000** | **71.1607** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.0707 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 3.7000e-004 | 3.7000e-004 | 0.0000 | 0.0000 | 3.9000e-004 |
| Energy | 5.9000e-004 | 5.4000e-003 | 4.5300e-003 | 3.0000e-005 | | 4.1000e-004 | 4.1000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 66.9457 | 66.9457 | 2.9200e-003 | 6.9000e-004 | 67.2205 |
| Mobile | 0.3783 | 0.8956 | 3.7094 | 5.6800e-003 | 0.3867 | 0.0162 | 0.4028 | 0.1034 | 0.0148 | 0.1183 | 0.0000 | 486.8066 | 486.8066 | 0.0252 | 0.0000 | 487.3362 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 4.9895 | 0.0000 | 4.9895 | 0.2949 | 0.0000 | 11.1818 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.4909 | 8.7803 | 9.2711 | 0.0508 | 1.2700e-003 | 10.7333 |
| **Total** | **0.4495** | **0.9010** | **3.7141** | **5.7100e-003** | **0.3867** | **0.0166** | **0.4032** | **0.1034** | **0.0152** | **0.1187** | **5.4804** | **562.5330** | **568.0134** | **0.3738** | **1.9600e-003** | **576.4723** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.0707 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 3.7000e-004 | 3.7000e-004 | 0.0000 | 0.0000 | 3.9000e-004 |
| Energy | 5.9000e-004 | 5.4000e-003 | 4.5300e-003 | 3.0000e-005 | | 4.1000e-004 | 4.1000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 66.9457 | 66.9457 | 2.9200e-003 | 6.9000e-004 | 67.2205 |
| Mobile | 0.3783 | 0.8956 | 3.7094 | 5.6800e-003 | 0.3867 | 0.0162 | 0.4028 | 0.1034 | 0.0148 | 0.1183 | 0.0000 | 486.8066 | 486.8066 | 0.0252 | 0.0000 | 487.3362 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 4.9895 | 0.0000 | 4.9895 | 0.2949 | 0.0000 | 11.1818 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.4909 | 8.7803 | 9.2711 | 0.0508 | 1.2700e-003 | 10.7325 |
| **Total** | **0.4495** | **0.9010** | **3.7141** | **5.7100e-003** | **0.3867** | **0.0166** | **0.4032** | **0.1034** | **0.0152** | **0.1187** | **5.4804** | **562.5330** | **568.0134** | **0.3738** | **1.9600e-003** | **576.4715** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

# 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 1/1/2014 | 1/14/2014 | 5 | 10 | |
| 2 | Site Preparation | Site Preparation | 1/15/2014 | 1/15/2014 | 5 | 1 | |
| 3 | Grading | Grading | 1/16/2014 | 1/17/2014 | 5 | 2 | |
| 4 | Building Construction | Building Construction | 1/18/2014 | 6/6/2014 | 5 | 100 | |
| 5 | Paving | Paving | 6/7/2014 | 6/13/2014 | 5 | 5 | |
| 6 | Architectural Coating | Architectural Coating | 6/14/2014 | 6/20/2014 | 5 | 5 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 22,200; Non-Residential Outdoor: 7,400 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Rubber Tired Dozers | 1 | 1.00 | 255 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 174 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Rubber Tired Dozers | 1 | 1.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 4.00 | 226 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 7.00 | 125 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 5 | 5.00 | 2.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 1.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2014

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 7.4600e-003 | 0.0625 | 0.0443 | 6.0000e-005 | | 4.6500e-003 | 4.6500e-003 | | 4.4500e-003 | 4.4500e-003 | 0.0000 | 5.4760 | 5.4760 | 1.1400e-003 | 0.0000 | 5.4999 |
| **Total** | **7.4600e-003** | **0.0625** | **0.0443** | **6.0000e-005** | | **4.6500e-003** | **4.6500e-003** | | **4.4500e-003** | **4.4500e-003** | **0.0000** | **5.4760** | **5.4760** | **1.1400e-003** | **0.0000** | **5.4999** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.5000e-004 | 3.6000e-004 | 3.7700e-003 | 1.0000e-005 | 5.5000e-004 | 1.0000e-005 | 5.5000e-004 | 1.5000e-004 | 0.0000 | 1.5000e-004 | 0.0000 | 0.5501 | 0.5501 | 3.0000e-005 | 0.0000 | 0.5508 |
| **Total** | **2.5000e-004** | **3.6000e-004** | **3.7700e-003** | **1.0000e-005** | **5.5000e-004** | **1.0000e-005** | **5.5000e-004** | **1.5000e-004** | **0.0000** | **1.5000e-004** | **0.0000** | **0.5501** | **0.5501** | **3.0000e-005** | **0.0000** | **0.5508** |

## 3.2 Demolition - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 7.4600e-003 | 0.0625 | 0.0443 | 6.0000e-005 | | 4.6500e-003 | 4.6500e-003 | | 4.4500e-003 | 4.4500e-003 | 0.0000 | 5.4760 | 5.4760 | 1.1400e-003 | 0.0000 | 5.4999 |
| **Total** | **7.4600e-003** | **0.0625** | **0.0443** | **6.0000e-005** | | **4.6500e-003** | **4.6500e-003** | | **4.4500e-003** | **4.4500e-003** | **0.0000** | **5.4760** | **5.4760** | **1.1400e-003** | **0.0000** | **5.4999** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.5000e-004 | 3.6000e-004 | 3.7700e-003 | 1.0000e-005 | 5.5000e-004 | 1.0000e-005 | 5.5000e-004 | 1.5000e-004 | 0.0000 | 1.5000e-004 | 0.0000 | 0.5501 | 0.5501 | 3.0000e-005 | 0.0000 | 0.5508 |
| **Total** | **2.5000e-004** | **3.6000e-004** | **3.7700e-003** | **1.0000e-005** | **5.5000e-004** | **1.0000e-005** | **5.5000e-004** | **1.5000e-004** | **0.0000** | **1.5000e-004** | **0.0000** | **0.5501** | **0.5501** | **3.0000e-005** | **0.0000** | **0.5508** |

## 3.3 Site Preparation - 2014

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2000e-004 | 7.2400e-003 | 3.7000e-003 | 0.0000 | | 4.5000e-004 | 4.5000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 0.4514 | 0.4514 | 1.3000e-004 | 0.0000 | 0.4542 |
| **Total** | **7.2000e-004** | **7.2400e-003** | **3.7000e-003** | **0.0000** | **2.7000e-004** | **4.5000e-004** | **7.2000e-004** | **3.0000e-005** | **4.1000e-004** | **4.4000e-004** | **0.0000** | **0.4514** | **0.4514** | **1.3000e-004** | **0.0000** | **0.4542** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.0000e-005 | 2.0000e-005 | 1.9000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0275 | 0.0275 | 0.0000 | 0.0000 | 0.0275 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.9000e-004** | **0.0000** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0275** | **0.0275** | **0.0000** | **0.0000** | **0.0275** |

## 3.3 Site Preparation - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2000e-004 | 7.2400e-003 | 3.7000e-003 | 0.0000 | | 4.5000e-004 | 4.5000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 0.4514 | 0.4514 | 1.3000e-004 | 0.0000 | 0.4542 |
| **Total** | **7.2000e-004** | **7.2400e-003** | **3.7000e-003** | **0.0000** | **2.7000e-004** | **4.5000e-004** | **7.2000e-004** | **3.0000e-005** | **4.1000e-004** | **4.4000e-004** | **0.0000** | **0.4514** | **0.4514** | **1.3000e-004** | **0.0000** | **0.4542** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.0000e-005 | 2.0000e-005 | 1.9000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0275 | 0.0275 | 0.0000 | 0.0000 | 0.0275 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.9000e-004** | **0.0000** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0275** | **0.0275** | **0.0000** | **0.0000** | **0.0275** |

## 3.4 Grading - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 7.5000e-004 | 0.0000 | 7.5000e-004 | 4.1000e-004 | 0.0000 | 4.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.4900e-003 | 0.0125 | 8.8500e-003 | 1.0000e-005 | | 9.3000e-004 | 9.3000e-004 | | 8.9000e-004 | 8.9000e-004 | 0.0000 | 1.0952 | 1.0952 | 2.3000e-004 | 0.0000 | 1.1000 |
| **Total** | **1.4900e-003** | **0.0125** | **8.8500e-003** | **1.0000e-005** | **7.5000e-004** | **9.3000e-004** | **1.6800e-003** | **4.1000e-004** | **8.9000e-004** | **1.3000e-003** | **0.0000** | **1.0952** | **1.0952** | **2.3000e-004** | **0.0000** | **1.1000** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.0000e-005 | 7.0000e-005 | 7.5000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.1100 | 0.1100 | 1.0000e-005 | 0.0000 | 0.1102 |
| **Total** | **5.0000e-005** | **7.0000e-005** | **7.5000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **0.0000** | **0.1100** | **0.1100** | **1.0000e-005** | **0.0000** | **0.1102** |

### 3.4 Grading - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 7.5000e-004 | 0.0000 | 7.5000e-004 | 4.1000e-004 | 0.0000 | 4.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.4900e-003 | 0.0125 | 8.8500e-003 | 1.0000e-005 | | 9.3000e-004 | 9.3000e-004 | | 8.9000e-004 | 8.9000e-004 | 0.0000 | 1.0952 | 1.0952 | 2.3000e-004 | 0.0000 | 1.1000 |
| **Total** | **1.4900e-003** | **0.0125** | **8.8500e-003** | **1.0000e-005** | **7.5000e-004** | **9.3000e-004** | **1.6800e-003** | **4.1000e-004** | **8.9000e-004** | **1.3000e-003** | **0.0000** | **1.0952** | **1.0952** | **2.3000e-004** | **0.0000** | **1.1000** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.0000e-005 | 7.0000e-005 | 7.5000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.1100 | 0.1100 | 1.0000e-005 | 0.0000 | 0.1102 |
| **Total** | **5.0000e-005** | **7.0000e-005** | **7.5000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **0.0000** | **0.1100** | **0.1100** | **1.0000e-005** | **0.0000** | **0.1102** |

## 3.5 Building Construction - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0747 | 0.7417 | 0.4171 | 5.7000e-004 | | 0.0517 | 0.0517 | | 0.0475 | 0.0475 | 0.0000 | 54.6284 | 54.6284 | 0.0161 | 0.0000 | 54.9674 |
| **Total** | **0.0747** | **0.7417** | **0.4171** | **5.7000e-004** | | **0.0517** | **0.0517** | | **0.0475** | **0.0475** | **0.0000** | **54.6284** | **54.6284** | **0.0161** | **0.0000** | **54.9674** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.1700e-003 | 0.0118 | 0.0137 | 2.0000e-005 | 6.1000e-004 | 2.2000e-004 | 8.4000e-004 | 1.8000e-004 | 2.0000e-004 | 3.8000e-004 | 0.0000 | 2.0168 | 2.0168 | 2.0000e-005 | 0.0000 | 2.0172 |
| Worker | 1.2400e-003 | 1.8200e-003 | 0.0189 | 3.0000e-005 | 2.7400e-003 | 3.0000e-005 | 2.7700e-003 | 7.3000e-004 | 2.0000e-005 | 7.5000e-004 | 0.0000 | 2.7503 | 2.7503 | 1.6000e-004 | 0.0000 | 2.7538 |
| **Total** | **2.4100e-003** | **0.0136** | **0.0326** | **5.0000e-005** | **3.3500e-003** | **2.5000e-004** | **3.6100e-003** | **9.1000e-004** | **2.2000e-004** | **1.1300e-003** | **0.0000** | **4.7671** | **4.7671** | **1.8000e-004** | **0.0000** | **4.7710** |

## 3.5 Building Construction - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0747 | 0.7417 | 0.4171 | 5.7000e-004 | | 0.0517 | 0.0517 | | 0.0475 | 0.0475 | 0.0000 | 54.6283 | 54.6283 | 0.0161 | 0.0000 | 54.9673 |
| **Total** | **0.0747** | **0.7417** | **0.4171** | **5.7000e-004** | | **0.0517** | **0.0517** | | **0.0475** | **0.0475** | **0.0000** | **54.6283** | **54.6283** | **0.0161** | **0.0000** | **54.9673** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.1700e-003 | 0.0118 | 0.0137 | 2.0000e-005 | 6.1000e-004 | 2.2000e-004 | 8.4000e-004 | 1.8000e-004 | 2.0000e-004 | 3.8000e-004 | 0.0000 | 2.0168 | 2.0168 | 2.0000e-005 | 0.0000 | 2.0172 |
| Worker | 1.2400e-003 | 1.8200e-003 | 0.0189 | 3.0000e-005 | 2.7400e-003 | 3.0000e-005 | 2.7700e-003 | 7.3000e-004 | 2.0000e-005 | 7.5000e-004 | 0.0000 | 2.7503 | 2.7503 | 1.6000e-004 | 0.0000 | 2.7538 |
| **Total** | **2.4100e-003** | **0.0136** | **0.0326** | **5.0000e-005** | **3.3500e-003** | **2.5000e-004** | **3.6100e-003** | **9.1000e-004** | **2.2000e-004** | **1.1300e-003** | **0.0000** | **4.7671** | **4.7671** | **1.8000e-004** | **0.0000** | **4.7710** |

### 3.6 Paving - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 3.0800e-003 | 0.0296 | 0.0184 | 3.0000e-005 | | 1.8600e-003 | 1.8600e-003 | | 1.7200e-003 | 1.7200e-003 | 0.0000 | 2.5022 | 2.5022 | 6.7000e-004 | 0.0000 | 2.5164 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **3.0800e-003** | **0.0296** | **0.0184** | **3.0000e-005** | | **1.8600e-003** | **1.8600e-003** | | **1.7200e-003** | **1.7200e-003** | **0.0000** | **2.5022** | **2.5022** | **6.7000e-004** | **0.0000** | **2.5164** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.2000e-004 | 3.3000e-004 | 3.3900e-003 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 5.0000e-004 | 1.3000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4951 | 0.4951 | 3.0000e-005 | 0.0000 | 0.4957 |
| **Total** | **2.2000e-004** | **3.3000e-004** | **3.3900e-003** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **5.0000e-004** | **1.3000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4951** | **0.4951** | **3.0000e-005** | **0.0000** | **0.4957** |

### 3.6 Paving - 2014

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 3.0800e-003 | 0.0296 | 0.0184 | 3.0000e-005 | | 1.8600e-003 | 1.8600e-003 | | 1.7200e-003 | 1.7200e-003 | 0.0000 | 2.5022 | 2.5022 | 6.7000e-004 | 0.0000 | 2.5164 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **3.0800e-003** | **0.0296** | **0.0184** | **3.0000e-005** | | **1.8600e-003** | **1.8600e-003** | | **1.7200e-003** | **1.7200e-003** | **0.0000** | **2.5022** | **2.5022** | **6.7000e-004** | **0.0000** | **2.5164** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.2000e-004 | 3.3000e-004 | 3.3900e-003 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 5.0000e-004 | 1.3000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4951 | 0.4951 | 3.0000e-005 | 0.0000 | 0.4957 |
| **Total** | **2.2000e-004** | **3.3000e-004** | **3.3900e-003** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **5.0000e-004** | **1.3000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4951** | **0.4951** | **3.0000e-005** | **0.0000** | **0.4957** |

## 3.7 Architectural Coating - 2014

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.1715 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.1200e-003 | 6.9400e-003 | 4.8000e-003 | 1.0000e-005 | | 6.1000e-004 | 6.1000e-004 | | 6.1000e-004 | 6.1000e-004 | 0.0000 | 0.6383 | 0.6383 | 9.0000e-005 | 0.0000 | 0.6402 |
| **Total** | **0.1726** | **6.9400e-003** | **4.8000e-003** | **1.0000e-005** | | **6.1000e-004** | **6.1000e-004** | | **6.1000e-004** | **6.1000e-004** | **0.0000** | **0.6383** | **0.6383** | **9.0000e-005** | **0.0000** | **0.6402** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.0000e-005 | 2.0000e-005 | 1.9000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0275 | 0.0275 | 0.0000 | 0.0000 | 0.0275 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.9000e-004** | **0.0000** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0275** | **0.0275** | **0.0000** | **0.0000** | **0.0275** |

## 3.7 Architectural Coating - 2014

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.1715 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.1200e-003 | 6.9400e-003 | 4.8000e-003 | 1.0000e-005 | | 6.1000e-004 | 6.1000e-004 | | 6.1000e-004 | 6.1000e-004 | 0.0000 | 0.6383 | 0.6383 | 9.0000e-005 | 0.0000 | 0.6402 |
| **Total** | **0.1726** | **6.9400e-003** | **4.8000e-003** | **1.0000e-005** | | **6.1000e-004** | **6.1000e-004** | | **6.1000e-004** | **6.1000e-004** | **0.0000** | **0.6383** | **0.6383** | **9.0000e-005** | **0.0000** | **0.6402** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.0000e-005 | 2.0000e-005 | 1.9000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0275 | 0.0275 | 0.0000 | 0.0000 | 0.0275 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.9000e-004** | **0.0000** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0275** | **0.0275** | **0.0000** | **0.0000** | **0.0275** |

## 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.3783 | 0.8956 | 3.7094 | 5.6800e-003 | 0.3867 | 0.0162 | 0.4028 | 0.1034 | 0.0148 | 0.1183 | 0.0000 | 486.8066 | 486.8066 | 0.0252 | 0.0000 | 487.3362 |
| Unmitigated | 0.3783 | 0.8956 | 3.7094 | 5.6800e-003 | 0.3867 | 0.0162 | 0.4028 | 0.1034 | 0.0148 | 0.1183 | 0.0000 | 486.8066 | 486.8066 | 0.0252 | 0.0000 | 487.3362 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Automobile Care Center | 99.20 | 99.20 | 99.20 | 132,884 | 132,884 |
| General Office Building | 46.24 | 9.95 | 4.12 | 112,880 | 112,880 |
| Racquet Club | 36.22 | 22.96 | 29.40 | 68,016 | 68,016 |
| Regional Shopping Center | 339.23 | 394.76 | 199.40 | 707,648 | 707,648 |
| Total | 520.89 | 526.87 | 332.12 | 1,021,428 | 1,021,428 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Automobile Care Center | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 21 | 51 | 28 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| Racquet Club | 16.60 | 8.40 | 6.90 | 11.50 | 69.50 | 19.00 | 52 | 39 | 9 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.517496 | 0.060616 | 0.179855 | 0.141540 | 0.041435 | 0.006630 | 0.014687 | 0.026300 | 0.001931 | 0.002544 | 0.004287 | 0.000607 | 0.002072 |

## 4.4 Fleet Mix

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 61.0692 | 61.0692 | 2.8100e-003 | 5.8000e-004 | 61.3082 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 61.0692 | 61.0692 | 2.8100e-003 | 5.8000e-004 | 61.3082 |
| NaturalGas Mitigated | 5.9000e-004 | 5.4000e-003 | 4.5300e-003 | 3.0000e-005 | | 4.1000e-004 | 4.1000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 5.8766 | 5.8766 | 1.1000e-004 | 1.1000e-004 | 5.9124 |
| NaturalGas Unmitigated | 5.9000e-004 | 5.4000e-003 | 4.5300e-003 | 3.0000e-005 | | 4.1000e-004 | 4.1000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 5.8766 | 5.8766 | 1.1000e-004 | 1.1000e-004 | 5.9124 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| General Office Building | 45906 | 2.5000e-004 | 2.2500e-003 | 1.8900e-003 | 1.0000e-005 | | 1.7000e-004 | 1.7000e-004 | | 1.7000e-004 | 1.7000e-004 | 0.0000 | 2.4497 | 2.4497 | 5.0000e-005 | 4.0000e-005 | 2.4646 |
| Racquet Club | 20691 | 1.1000e-004 | 1.0100e-003 | 8.5000e-004 | 1.0000e-005 | | 8.0000e-005 | 8.0000e-005 | | 8.0000e-005 | 8.0000e-005 | 0.0000 | 1.1042 | 1.1042 | 2.0000e-005 | 2.0000e-005 | 1.1109 |
| Regional Shopping Center | 13430 | 7.0000e-005 | 6.6000e-004 | 5.5000e-004 | 0.0000 | | 5.0000e-005 | 5.0000e-005 | | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.7167 | 0.7167 | 1.0000e-005 | 1.0000e-005 | 0.7210 |
| Automobile Care Center | 30096 | 1.6000e-004 | 1.4800e-003 | 1.2400e-003 | 1.0000e-005 | | 1.1000e-004 | 1.1000e-004 | | 1.1000e-004 | 1.1000e-004 | 0.0000 | 1.6060 | 1.6060 | 3.0000e-005 | 3.0000e-005 | 1.6158 |
| **Total** | | **5.9000e-004** | **5.4000e-003** | **4.5300e-003** | **3.0000e-005** | | **4.1000e-004** | **4.1000e-004** | | **4.1000e-004** | **4.1000e-004** | **0.0000** | **5.8766** | **5.8766** | **1.1000e-004** | **1.0000e-004** | **5.9124** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| General Office Building | 45906 | 2.5000e-004 | 2.2500e-003 | 1.8900e-003 | 1.0000e-005 | | 1.7000e-004 | 1.7000e-004 | | 1.7000e-004 | 1.7000e-004 | 0.0000 | 2.4497 | 2.4497 | 5.0000e-005 | 4.0000e-005 | 2.4646 |
| Racquet Club | 20691 | 1.1000e-004 | 1.0100e-003 | 8.5000e-004 | 1.0000e-005 | | 8.0000e-005 | 8.0000e-005 | | 8.0000e-005 | 8.0000e-005 | 0.0000 | 1.1042 | 1.1042 | 2.0000e-005 | 2.0000e-005 | 1.1109 |
| Regional Shopping Center | 13430 | 7.0000e-005 | 6.6000e-004 | 5.5000e-004 | 0.0000 | | 5.0000e-005 | 5.0000e-005 | | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.7167 | 0.7167 | 1.0000e-005 | 1.0000e-005 | 0.7210 |
| Automobile Care Center | 30096 | 1.6000e-004 | 1.4800e-003 | 1.2400e-003 | 1.0000e-005 | | 1.1000e-004 | 1.1000e-004 | | 1.1000e-004 | 1.1000e-004 | 0.0000 | 1.6060 | 1.6060 | 3.0000e-005 | 3.0000e-005 | 1.6158 |
| **Total** | | **5.9000e-004** | **5.4000e-003** | **4.5300e-003** | **3.0000e-005** | | **4.1000e-004** | **4.1000e-004** | | **4.1000e-004** | **4.1000e-004** | **0.0000** | **5.8766** | **5.8766** | **1.1000e-004** | **1.0000e-004** | **5.9124** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Automobile Care Center | 19280 | 5.5173 | 2.5000e-004 | 5.0000e-005 | 5.5389 |
| General Office Building | 61026 | 17.4636 | 8.0000e-004 | 1.7000e-004 | 17.5320 |
| Racquet Club | 13255 | 3.7931 | 1.7000e-004 | 4.0000e-005 | 3.8080 |
| Regional Shopping Center | 119843 | 34.2951 | 1.5800e-003 | 3.3000e-004 | 34.4293 |
| **Total** | | **61.0692** | **2.8000e-003** | **5.9000e-004** | **61.3082** |

### 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Automobile Care Center | 19280 | 5.5173 | 2.5000e-004 | 5.0000e-005 | 5.5389 |
| General Office Building | 61026 | 17.4636 | 8.0000e-004 | 1.7000e-004 | 17.5320 |
| Racquet Club | 13255 | 3.7931 | 1.7000e-004 | 4.0000e-005 | 3.8080 |
| Regional Shopping Center | 119843 | 34.2951 | 1.5800e-003 | 3.3000e-004 | 34.4293 |
| **Total** | | **61.0692** | **2.8000e-003** | **5.9000e-004** | **61.3082** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0707 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 3.7000e-004 | 3.7000e-004 | 0.0000 | 0.0000 | 3.9000e-004 |
| Unmitigated | 0.0707 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 3.7000e-004 | 3.7000e-004 | 0.0000 | 0.0000 | 3.9000e-004 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0172 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0535 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 3.7000e-004 | 3.7000e-004 | 0.0000 | 0.0000 | 3.9000e-004 |
| **Total** | **0.0707** | **0.0000** | **2.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **3.7000e-004** | **3.7000e-004** | **0.0000** | **0.0000** | **3.9000e-004** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0172 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0535 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 3.7000e-004 | 3.7000e-004 | 0.0000 | 0.0000 | 3.9000e-004 |
| **Total** | **0.0707** | **0.0000** | **2.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **3.7000e-004** | **3.7000e-004** | **0.0000** | **0.0000** | **3.9000e-004** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 9.2711 | 0.0508 | 1.2700e-003 | 10.7325 |
| Unmitigated | 9.2711 | 0.0508 | 1.2700e-003 | 10.7333 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Automobile Care Center | 0.15053 / 0.0922602 | 0.9020 | 4.9400e-003 | 1.2000e-004 | 1.0442 |
| General Office Building | 0.746482 / 0.457521 | 4.4730 | 0.0245 | 6.1000e-004 | 5.1784 |
| Racquet Club | 0.0650575 / 0.0398739 | 0.3898 | 2.1400e-003 | 5.0000e-005 | 0.4513 |
| Regional Shopping Center | 0.585173 / 0.358654 | 3.5064 | 0.0192 | 4.8000e-004 | 4.0594 |
| **Total** | | **9.2711** | **0.0508** | **1.2600e-003** | **10.7333** |

## 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Automobile Care Center | 0.15053 / 0.0922602 | 0.9020 | 4.9400e-003 | 1.2000e-004 | 1.0442 |
| General Office Building | 0.746482 / 0.457521 | 4.4730 | 0.0245 | 6.1000e-004 | 5.1780 |
| Racquet Club | 0.0650575 / 0.0398739 | 0.3898 | 2.1400e-003 | 5.0000e-005 | 0.4513 |
| Regional Shopping Center | 0.585173 / 0.358654 | 3.5064 | 0.0192 | 4.8000e-004 | 4.0591 |
| **Total** | | **9.2711** | **0.0508** | **1.2600e-003** | **10.7325** |

# 8.0 Waste Detail

## 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 4.9895 | 0.2949 | 0.0000 | 11.1818 |
| Unmitigated | 4.9895 | 0.2949 | 0.0000 | 11.1818 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Automobile Care Center | 6.11 | 1.2403 | 0.0733 | 0.0000 | 2.7795 |
| General Office Building | 3.91 | 0.7937 | 0.0469 | 0.0000 | 1.7787 |
| Racquet Club | 6.27 | 1.2728 | 0.0752 | 0.0000 | 2.8523 |
| Regional Shopping Center | 8.29 | 1.6828 | 0.0995 | 0.0000 | 3.7713 |
| **Total** | | **4.9895** | **0.2949** | **0.0000** | **11.1818** |

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Automobile Care Center | 6.11 | 1.2403 | 0.0733 | 0.0000 | 2.7795 |
| General Office Building | 3.91 | 0.7937 | 0.0469 | 0.0000 | 1.7787 |
| Racquet Club | 6.27 | 1.2728 | 0.0752 | 0.0000 | 2.8523 |
| Regional Shopping Center | 8.29 | 1.6828 | 0.0995 | 0.0000 | 3.7713 |
| **Total** | | **4.9895** | **0.2949** | **0.0000** | **11.1818** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Vegetation

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | Roadway Type | No. of Lanes | Approach/Departure Speed A.M. | Approach/Departure Speed P.M. |
|---|---|---|---|---|---|
| North-South Roadway: | Palawan | AT GRADE | 2 | 5 | 5 |
| East-West Roadway: | Washington | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| Year | Average Speed (miles per hour) 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | | | | |
|---|---|---|---|---|---|
| N | | | | | |
| | 0 | 0 | 0 | | |
| W | < | v | > | | E |
| 0 ^ | | | | ^ | 0 |
| 1,062 > | | | | < | 627 |
| 96 v | | | | v | 215 |
| | < | ^ | > | | |
| | 0 | 0 | 351 | | |
| S | | | | | |

PM Peak

| | | | | | |
|---|---|---|---|---|---|
| N | | | | | |
| | 0 | 0 | 0 | | |
| W | < | v | > | | E |
| 0 ^ | | | | ^ | 0 |
| 795 > | | | | < | 865 |
| 221 v | | | | v | 543 |
| | < | ^ | > | | |
| | 0 | 0 | 238 | | |
| S | | | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 662 | N-S Road | 1,002 |
| E-W Road | 2,255 | E-W Road | 2,441 |
| Primary Road = | E-W Road | Primary Road = | E-W Road |

ROADWAY CO CONTRIBUTIONS

| Roadway | Reference CO Concentrations 0 Feet | 25 Feet | 50 Feet | | Traffic Volume | | Emission Factor | | |
|---|---|---|---|---|---|---|---|---|---|
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.7 | 2.7 | 2.2 | * | 662 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 11.9 | 7.0 | 5.4 | * | 2,255 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.7 | 2.7 | 2.2 | * | 1,002 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 11.9 | 7.0 | 5.4 | * | 2,441 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 3.2 | 3.3 | 2.3 |
| 25 Feet from Roadway Edge | 2.7 | 2.8 | 1.9 |
| 50 Feet from Roadway Edge | 2.5 | 2.6 | 1.8 |

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Lincoln | AT GRADE | 6 | 5 | 5 |
| East-West Roadway: | Washington | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 164 | 1,587 | 339 | |
| W | | < | v | > | E |
| 208 ^ | | | | ^ | 245 |
| 878 > | | | | < | 714 |
| 604 v | | | | v | 163 |
| | | < | ^ | > | |
| | | 537 | 2,075 | 227 | |
| | | S | | | |

PM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 163 | 1,706 | 287 | |
| W | | < | v | > | E |
| 149 ^ | | | | ^ | 360 |
| 995 > | | | | < | 945 |
| 580 v | | | | v | 358 |
| | | < | ^ | > | |
| | | 548 | 2,173 | 327 | |
| | | S | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | PM |
|---|---|---|
| N-S Road | 5,193 | 5,692 |
| E-W Road | 3,105 | 3,380 |
| Primary Road = | N-S Road | N-S Road |

ROADWAY CO CONTRIBUTIONS

| Roadway | Reference CO Concentrations 0 Feet | 25 Feet | 50 Feet | | Traffic Volume | | Emission Factor | | |
|---|---|---|---|---|---|---|---|---|---|
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 5,193 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 3,105 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 5,692 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 3,380 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 4.3 | 4.6 | 3.2 |
| 25 Feet from Roadway Edge | 3.6 | 3.7 | 2.6 |
| 50 Feet from Roadway Edge | 3.3 | 3.4 | 2.4 |

# BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Glencoe | AT GRADE | 4 | 5 | 5 |
| East-West Roadway: | Washington | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles
Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | | | | |
|---|---|---|---|---|---|
| | N | | | | |
| | | 23 | 42 | 103 | |
| W | | < | v | > | E |
| 22 ^ | | | | ^ | 167 |
| 1,219 > | | | | < | 805 |
| 134 v | | | | v | 286 |
| | | < | ^ | > | |
| | | 260 | 64 | 351 | |
| | S | | | | |

PM Peak

| | | | | | |
|---|---|---|---|---|---|
| | N | | | | |
| | | 82 | 151 | 512 | |
| W | | < | v | > | E |
| 56 ^ | | | | ^ | 291 |
| 1,283 > | | | | < | 1,463 |
| 302 v | | | | v | 531 |
| | | < | ^ | > | |
| | | 189 | 186 | 362 | |
| | S | | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 1,137 | N-S Road | 1,721 |
| E-W Road | 2,931 | E-W Road | 4,442 |
| Primary Road = | E-W Road | Primary Road = | E-W Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | Traffic | | Emission | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Volume | | Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.3 | 2.6 | 2.2 | * | 1,137 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 11.9 | 7.0 | 5.4 | * | 2,931 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.3 | 2.6 | 2.2 | * | 1,721 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 11.9 | 7.0 | 5.4 | * | 4,442 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 3.5 | 4.3 | 3.0 |
| 25 Feet from Roadway Edge | 2.9 | 3.4 | 2.4 |
| 50 Feet from Roadway Edge | 2.7 | 3.1 | 2.2 |

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Lincoln Blvd | AT GRADE | 6 | 5 | 5 |
| East-West Roadway: | Venice | AT GRADE | 6 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 49 | 1,503 | 193 | |
| W | | < | v | > | E |
| 143 ^ | | | | ^ | 247 |
| 859 > | | | | < | 1,016 |
| 210 v | | | | v | 408 |
| | | < | ^ | > | |
| | | 238 | 1,914 | 168 | |
| | | S | | | |

PM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 41 | 1,354 | 193 | |
| W | | < | v | > | E |
| 119 ^ | | | | ^ | 165 |
| 900 > | | | | < | 964 |
| 248 v | | | | v | 315 |
| | | < | ^ | > | |
| | | 255 | 1,889 | 242 | |
| | | S | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | PM |
|---|---|---|
| N-S Road | 4,441 | 4,303 |
| E-W Road | 2,891 | 2,779 |
| Primary Road = | N-S Road | N-S Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | Traffic | | Emission | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Volume | | Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 4,441 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 2.8 | 2.3 | 2.0 | * | 2,891 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 4,303 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 2.8 | 2.3 | 2.0 | * | 2,779 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 4.0 | 3.9 | 2.8 |
| 25 Feet from Roadway Edge | 3.3 | 3.3 | 2.3 |
| 50 Feet from Roadway Edge | 3.1 | 3.0 | 2.2 |

**BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007**

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Marina Expwy | AT GRADE | 2 | 5 | 5 |
| East-West Roadway: | Mindanao | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | N | | |
|---|---|---|---|---|
| | 15 | 1,171 | 22 | |
| W | < | v | > | E |
| 0 ^ | | | ^ 0 | |
| 414 > | | | < 957 | |
| 687 v | | | v 378 | |
| | < | ^ | > | |
| | 0 | 0 | 0 | |
| | | S | | |

PM Peak

| | | N | | |
|---|---|---|---|---|
| | 11 | 1,089 | 31 | |
| W | < | v | > | E |
| 0 ^ | | | ^ 0 | |
| 488 > | | | < 1,843 | |
| 703 v | | | v 527 | |
| | < | ^ | > | |
| | 0 | 0 | 0 | |
| | | S | | |

Representative Traffic Volumes (Vehicles per Hour)

| AM | | PM | |
|---|---|---|---|
| N-S Road | 2,236 | N-S Road | 2,319 |
| E-W Road | 2,073 | E-W Road | 3,045 |
| Primary Road = | N-S Road | Primary Road = | E-W Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Traffic Volume | | Emission Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 14.0 | 7.6 | 5.7 | * | 2,236 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 2,073 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.7 | 2.7 | 2.2 | * | 2,319 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 11.9 | 7.0 | 5.4 | * | 3,045 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 3.5 | 3.8 | 2.6 |
| 25 Feet from Roadway Edge | 2.9 | 3.1 | 2.2 |
| 50 Feet from Roadway Edge | 2.7 | 2.8 | 2.0 |

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Mindanao | AT GRADE | 4 | 5 | 5 |
| East-West Roadway: | Glencoe | AT GRADE | 2 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles
Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

N
72 416 14
W < v > E
63 ^ ^ 18
137 > < 171
395 v v 43
< ^ >
387 338 82
S

PM Peak

N
110 489 8
W < v > E
137 ^ ^ 21
205 > < 206
1,206 v v 91
< ^ >
406 449 56
S

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 1,661 | N-S Road | 2,697 |
| E-W Road | 1,225 | E-W Road | 2,270 |
| Primary Road = | N-S Road | Primary Road = | N-S Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | Traffic | | Emission | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Volume | | Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 11.9 | 7.0 | 5.4 | * | 1,661 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.7 | 2.7 | 2.2 | * | 1,225 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 11.9 | 7.0 | 5.4 | * | 2,697 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.7 | 2.7 | 2.2 | * | 2,270 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 3.0 | 3.6 | 2.5 |
| 25 Feet from Roadway Edge | 2.6 | 3.0 | 2.1 |
| 50 Feet from Roadway Edge | 2.5 | 2.8 | 1.9 |

# BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Lincoln | AT GRADE | 6 | 5 | 5 |
| East-West Roadway: | Mindanao | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | | | | |
|---|---|---|---|---|---|
| | N | | | | |
| | 71 | 1,847 | 186 | | |
| W | < | v | > | | E |
| 0 ^ | | | | ^ | 83 |
| 385 > | | | | < | 508 |
| 26 v | | | | v | 305 |
| | < | ^ | > | | |
| | 217 | 2,918 | 499 | | |
| | S | | | | |

PM Peak

| | | | | | |
|---|---|---|---|---|---|
| | N | | | | |
| | 105 | 1,666 | 154 | | |
| W | < | v | > | | E |
| 0 ^ | | | | ^ | 81 |
| 606 > | | | | < | 1,189 |
| 190 v | | | | v | 604 |
| | < | ^ | > | | |
| | 342 | 2,288 | 455 | | |
| | S | | | | |

Representative Traffic Volumes (Vehicles per Hour)

| AM | | PM | |
|---|---|---|---|
| N-S Road | 5,812 | N-S Road | 5,545 |
| E-W Road | 1,966 | E-W Road | 3,089 |
| Primary Road = | N-S Road | Primary Road = | N-S Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Traffic Volume | | Emission Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 5,812 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 1,966 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 5,545 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 3,089 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 4.4 | 4.5 | 3.1 |
| 25 Feet from Roadway Edge | 3.6 | 3.6 | 2.6 |
| 50 Feet from Roadway Edge | 3.3 | 3.3 | 2.3 |

# BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | Roadway Type | No. of Lanes | Approach/Departure Speed A.M. | Approach/Departure Speed P.M. |
|---|---|---|---|---|---|
| North-South Roadway: | Lincoln | AT GRADE | 6 | 5 | 5 |
| East-West Roadway: | Marina Expwy | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles
Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| Approach | < | v / ^ / > | > |
|---|---|---|---|
| N (southbound) | 0 | 1,703 | 924 |
| S (northbound) | 0 | 1,877 | 294 |

| Approach | ^ | > / < | v |
|---|---|---|---|
| W | 0 | 0 | 0 |
| E | 983 | 0 | 151 |

PM Peak

| Approach | < | v / ^ / > | > |
|---|---|---|---|
| N (southbound) | 0 | 2,012 | 923 |
| S (northbound) | 0 | 2,204 | 226 |

| Approach | ^ | > / < | v |
|---|---|---|---|
| W | 0 | 0 | 0 |
| E | 1,010 | 0 | 204 |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 5,487 | N-S Road | 6,149 |
| E-W Road | 2,352 | E-W Road | 2,363 |
| Primary Road = | N-S Road | Primary Road = | N-S Road |

ROADWAY CO CONTRIBUTIONS

| Roadway | Reference CO Concentrations 0 Feet | 25 Feet | 50 Feet | | Traffic Volume | | Emission Factor | | |
|---|---|---|---|---|---|---|---|---|---|
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 5,487 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 2,352 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 6,149 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 2,363 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 4.4 | 4.6 | 3.2 |
| 25 Feet from Roadway Edge | 3.6 | 3.7 | 2.6 |
| 50 Feet from Roadway Edge | 3.3 | 3.4 | 2.4 |

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Lincoln | AT GRADE | 6 | 5 | 5 |
| East-West Roadway: | Jefferson | AT GRADE | 4 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | | | |
|---|---|---|---|---|
| | N | | | |
| | 282 | 1,648 | 892 | |
| W | < | v | > | E |
| 259 ^ | | | ^ | 930 |
| 406 > | | | < | 164 |
| 33 v | | | v | 772 |
| | < | ^ | > | |
| | 20 | 2,968 | 925 | |
| | S | | | |

PM Peak

| | | | | |
|---|---|---|---|---|
| | N | | | |
| | 444 | 2,009 | 696 | |
| W | < | v | > | E |
| 43 ^ | | | ^ | 1,195 |
| 165 > | | | < | 304 |
| 58 v | | | v | 1,150 |
| | < | ^ | > | |
| | 29 | 2,371 | 638 | |
| | S | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 6,979 | N-S Road | 6,758 |
| E-W Road | 4,089 | E-W Road | 4,148 |
| Primary Road = | N-S Road | Primary Road = | N-S Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | Traffic | | Emission | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Volume | | Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 6,979 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 4,089 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 6,758 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.3 | 2.6 | 2.2 | * | 4,148 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 5.1 | 5.1 | 3.6 |
| 25 Feet from Roadway Edge | 4.1 | 4.0 | 2.9 |
| 50 Feet from Roadway Edge | 3.7 | 3.7 | 2.6 |

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Lincoln | AT GRADE | 6 | 5 | 5 |
| East-West Roadway: | Fiji | AT GRADE | 2 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 85 | 2,076 | 39 | |
| W | | < | v | > | E |
| 219 ^ | | | | ^ | 0 |
| 21 > | | | | < | 2 |
| 707 v | | | | v | 11 |
| | | < | ^ | > | |
| | | 721 | 3,383 | 39 | |
| | | S | | | |

PM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 174 | 2,279 | 26 | |
| W | | < | v | > | E |
| 217 ^ | | | | ^ | 39 |
| 16 > | | | | < | 20 |
| 848 v | | | | v | 35 |
| | | < | ^ | > | |
| | | 751 | 2,833 | 21 | |
| | | S | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 6,937 | N-S Road | 6,767 |
| E-W Road | 1,755 | E-W Road | 2,026 |
| Primary Road = | N-S Road | Primary Road = | N-S Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | Traffic | | Emission | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Volume | | Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 6,937 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.7 | 2.7 | 2.2 | * | 1,755 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 9.5 | 6.1 | 4.9 | * | 6,767 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 3.7 | 2.7 | 2.2 | * | 2,026 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 4.9 | 4.8 | 3.4 |
| 25 Feet from Roadway Edge | 3.9 | 3.8 | 2.7 |
| 50 Feet from Roadway Edge | 3.5 | 3.5 | 2.4 |

## BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS; UPDATED WITH EMFAC2007

| | |
|---|---|
| Project Title: | Parcel 44 |
| Intersection: | Venice Blvd and Lincoln Blvd |
| Analysis Condition: | Future w/Project |
| Nearest Air Monitoring Station measuring CO: | Wilshire Blvd and Sawtelle Blvd, Los Angeles, CA 90025 |
| Background 1-hour CO Concentration (ppm): | 2.0 |
| Background 8-hour CO Concentration (ppm): | 1.4 |
| Persistence Factor: | 0.7 |
| Analysis Year: | 2015 |

| | | | | Approach/Departure Speed | |
|---|---|---|---|---|---|
| | | Roadway Type | No. of Lanes | A.M. | P.M. |
| North-South Roadway: | Via Marina | AT GRADE | 4 | 5 | 5 |
| East-West Roadway: | Admiralty | AT GRADE | 2 | 5 | 5 |

EMFAC2007 COMPOSITE EMISSION FACTORS FOR CO

Air Basin: South Coast County: Los Angeles

Assumes lowest mean wintertime temperature of 47 degrees F and 52% humidity.

| | Average Speed (miles per hour) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 |
| 2010 | 6.419 | 5.647 | 5.034 | 4.542 | 4.142 | 3.818 | 3.553 | 3.333 | 3.15 | 3 |
| 2011 | 5.798 | 5.116 | 4.572 | 4.134 | 3.777 | 3.487 | 3.249 | 3.051 | 2.886 | 2.749 |
| 2012 | 5.251 | 4.645 | 4.161 | 3.77 | 3.451 | 3.19 | 2.976 | 2.797 | 2.647 | 2.522 |
| 2013 | 4.757 | 4.22 | 3.79 | 3.44 | 3.154 | 2.92 | 2.728 | 2.566 | 2.43 | 2.316 |
| 2014 | 4.323 | 3.844 | 3.46 | 3.146 | 2.889 | 2.679 | 2.505 | 2.359 | 2.235 | 2.13 |
| 2015 | 3.937 | 3.51 | 3.165 | 2.883 | 2.651 | 2.461 | 2.305 | 2.172 | 2.059 | 1.963 |
| 2020 | 2.646 | 2.387 | 2.174 | 1.997 | 1.85 | 1.728 | 1.627 | 1.539 | 1.464 | 1.398 |
| 2025 | 1.949 | 1.77 | 1.621 | 1.496 | 1.392 | 1.306 | 1.233 | 1.17 | 1.115 | 1.067 |
| 2030 | 1.615 | 1.471 | 1.35 | 1.248 | 1.163 | 1.093 | 1.034 | 0.983 | 0.937 | 0.898 |
| 2035 | 1.403 | 1.276 | 1.17 | 1.081 | 1.007 | 0.946 | 0.896 | 0.852 | 0.813 | 0.779 |
| 2040 | 1.283 | 1.164 | 1.065 | 0.982 | 0.913 | 0.858 | 0.813 | 0.773 | 0.738 | 0.706 |

PEAK HOUR TURNING VOLUMES

AM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 0 | 215 | 285 | |
| W | | < | v | > | E |
| 0 ^ | | | | ^ | 681 |
| 0 > | | | | < | 0 |
| 0 v | | | | v | 442 |
| | | < | ^ | > | |
| | | 0 | 695 | 1,010 | |
| | | S | | | |

PM Peak

| | | N | | | |
|---|---|---|---|---|---|
| | | 0 | 467 | 659 | |
| W | | < | v | > | E |
| 0 ^ | | | | ^ | 538 |
| 0 > | | | | < | 0 |
| 0 v | | | | v | 1,254 |
| | | < | ^ | > | |
| | | 0 | 489 | 662 | |
| | | S | | | |

Representative Traffic Volumes (Vehicles per Hour)

| | AM | | PM |
|---|---|---|---|
| N-S Road | 2,362 | N-S Road | 2,872 |
| E-W Road | 2,418 | E-W Road | 3,113 |
| Primary Road = | E-W Road | Primary Road = | E-W Road |

ROADWAY CO CONTRIBUTIONS

| | Reference CO Concentrations | | | | Traffic | | Emission | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | 0 Feet | 25 Feet | 50 Feet | | Volume | | Factor | | |
| A.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.3 | 2.6 | 2.2 | * | 2,362 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 14.0 | 7.6 | 5.7 | * | 2,418 | * | 3.94 | ÷ | 100,000 |
| P.M. Peak Hour | | | | | | | | | |
| N-S Road | 3.3 | 2.6 | 2.2 | * | 2,872 | * | 3.94 | ÷ | 100,000 |
| E-W Road | 14.0 | 7.6 | 5.7 | * | 3,113 | * | 3.94 | ÷ | 100,000 |

TOTAL CO CONCENTRATIONS (ppm)

| | AM | PM | 8-Hour |
|---|---|---|---|
| 0 Feet from Roadway Edge | 3.6 | 4.1 | 2.9 |
| 25 Feet from Roadway Edge | 3.0 | 3.2 | 2.3 |
| 50 Feet from Roadway Edge | 2.7 | 2.9 | 2.1 |

## APPENDIX 4.4

## Geotechnical Reports

# GEOTECHNICAL ENGINEERING REPORT
# PROPOSED COMMERCIAL AND RETAIL DEVELOPMENT
# MARINA DEL REY – PARCEL 44
# NORTHWEST CORNER OF MINDANAO WAY AND ADMIRALTY WAY
# MARINA DEL REY AREA OF LOS ANGELES, CALIFORNIA

**Prepared for:**

**PACIFIC MARINA VENTURES, LLC**
**C/O PACIFIC OCEAN MANAGEMENT**
**13737 FIJI WAY C-10**
**MARINA DEL REY, CA 90292**

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**GDC Project No. LA-1049**
**June 01, 2012**

GROUP DELTA CONSULTANTS

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June 01, 2012

**Pacific Marina Venture, LLC**
c/o Pacific Ocean Management
13737 Fiji Way C-10
Marina del Rey, CA 90292

Attention: Mr. John Santry

Subject: Geotechnical Engineering Report
Proposed Commercial and Retail Development
Marina Del Rey – Parcel 44
Northwest Corner of Mindanao Way and Admiralty Way
Marina Eel Rey area of Los Angeles, California

Dear Mr. Santry:

**Group Delta Consultants (GDC)** is pleased to submit this geotechnical report for the proposed commercial and retail development located at Parcel 44, northwest corner of Mindanao Way and Admiralty Way, Marina del Rey area of Los Angeles, California.

We appreciate the opportunity to provide geotechnical services for this project. Should you have any questions regarding this report, or if we can be of further service, please call us at 310 320-5100.

Sincerely,
GROUP DELTA CONSULTANTS, INC.

REGISTERED PROFESSIONAL ENGINEER
YING LIU
C 74119
EXP 6/30/2013
CIVIL
STATE OF CALIFORNIA

Ying Liu, Ph.D., P.E.
Senior Engineer

Distribution: Addressee (pdf)

Y:\Projects\1000-1099\LA-1049 Marina Del Rey-Parcel 44\Report\LA1049 Geotechnical Engineering Report Rev 01 June 1 2012.doc

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**MARINA DEL REY – PARCEL 44**
**NORTHWEST CORNER OF MINDANAO WAY AND ADMIRALTY WAY**
**MARINA DEL REY AREA OF LOS ANGELES, CALIFORNIA**

## 1.0 INTRODUCTION

This report presents our geotechnical recommendations for the proposed commercial and retail development project. The site is located on Parcel 44, northwest corner of Mindanao Way and Admiralty Way, Marina del Rey area of Los Angeles, California. Figure 1 shows the site location. This report is prepared in general accordance with GDC's proposal L12-100 dated January 4, 2012.

### 1.1 Project Description

Parcel 44 is a "C" shaped parcel measuring approximately 900 feet by 680 feet. The site surrounds Basin "G" of the Marina. Currently, the site is occupied by 6 one-story structures, but predominately is covered with asphalt parking. The existing site grades range from El. +10 to +18 feet. The basins are protected by sea walls that are about 10 feet in height and are supported on timber piles. The existing sea walls were recently retrofitted by installing 24-inch diameter caissons about 3 to 10 ft behind the face of the sea wall and then anchoring the sea wall to the caissons by tieback anchors.

The proposed project will consist of demolition of the existing 6, 1-story boating related structures and construction of 7 new structures, including:

- 2 new restroom structures (Bldg Z-1 / Bldg I and III)
- A new one story retail grocery store (Bldg J / Bldg II)
- A new 2-story retail boat supply store (Bldg P / Bldg IV)
- A new one story building for boat broker offices (Bldg K / Bldg V).
- A one-story boaters lounge (Bldg X / Bldg VI)
- A one-story storage rack for boats (Bldg G1 / Bldg VII)

The proposed development is shown on Figure 2. All of the planned buildings are at grade structures. There are no basements planned at this time. Based on information provided by the structural engineer, the preliminary column and wall loads are provided below.

- Bldg G1 and J: Estimated interior column dead load is 23,500 lbs, and column roof live load is 13,500 lbs. Typical column tributary area is assumed 30'x38'6" at Bldg G1, and 50'x20x at Bldg J.

- Bldg K: Estimated interior column dead load is 12,000 lbs, and column live load is 9,600 lbs. Typical column tributary area is assumed 30'x20'.
- BLdg X and Z-1: Estimated exterior wall uniform dead load is 620 lbs/ft, and live load is 300 lbs/ft. No interior columns.
- Bldg P: Estimated interior column dead load is 40,000 lbs, and column live load is 50,000 lbs. Assume 100 PSF live load – Reducible retail at the 2nd floor of the building. Column trib. is assumed 20' x 35'-6".

## 1.2 Objectives and Scope of Work

The objective of this report is to provide site-specific geotechnical recommendations for the design and construction of the proposed structures. We performed the following general scope of work in order to fulfill the objectives of our services:

- Review of published geologic and geotechnical maps and reports pertaining to the site area;
- Conduct six mud rotary borings and 14 Cone Penetration Tests on the subject site to investigate subsurface conditions;
- Perform laboratory tests on selected soil samples to evaluate index properties and strength and compressibility parameters;
- Perform geologic and seismic hazard analysis including fault surface rupture, ground shaking, liquefaction, lateral spreading, and ground motion analyses;
- Perform site-specific geotechnical engineering analyses to develop recommendations for foundation design and construction of the proposed structures; and
- Preparation of this report.

# 2.0 GEOTECHNICAL INVESTIGATION

## 2.1 Field Exploration

To investigate the subsurface conditions at the site, a total of 6 soil borings and 14 cone penetrometer test (CPT) probes were completed at the locations shown in Figure 2. The borings were advanced to a depth ranging from 36.5 to 51.5 feet below the existing grade. The CPTs were advanced to depths ranging from about 30 to 80 feet below the existing grade, where refusal to further penetration was reached. Shear wave velocity was measured in CPT-12-07. The drilling was performed under the continuous technical supervision of our field engineer, who maintained a detailed log of the soils encountered and assisted in obtaining soil samples.

As the CPT probe was advanced, electronic instruments recorded a continuous profile of both the tip and frictional resistances, which were then analyzed using established correlations, to classify the soils and evaluate insitu properties, including density, strength and compressibility. Additional details concerning the field exploration program, including copies of all the boring and CPT logs, are included in Appendix A.

## 2.2 Laboratory Testing Program

The soil samples obtained from the borings were taken to our laboratory for further visual examination and laboratory testing. Laboratory test results assist in classifying samples, for evaluating their physical properties and engineering characteristics, and in correlating soils across the site. The laboratory testing is supplemented by the results of the Standard Penetration Tests (SPT) sampling conducted in the borings and the results of the CPT probes, which provide additional means to evaluate in situ soil properties, such as density, shear strength and compressibility. Details of the laboratory testing program, including test results, are included in Appendix B.

# 3.0 SITE AND SUBSURFACE CONDITIONS

## 3.1 Subsurface Conditions

Based on the Quaternary Geologic Map of the Venice Quadrangle, the site area is underlain by some artificial fill and native young alluvial-fan and floodplain deposits. A regional geologic map is shown in Figure 4.

The surface of the subject site (Approx. El. +10 to +18 ft) contains man-made improvements consisting of 6 single story buildings, asphalt concrete pavement, curbing, sidewalk, buried utilities. Below the surface improvements, the site is underlain by artificial fill, and native deposits predominantly consisting of firm to stiff clays interbedded with thin layers of silty sands, underlain by very dense sand. Generalized geotechnical cross-sections (Section A-A' to F-F') through the site are shown in Figures 3A through Figure 3F. The generalized soil layering is described below.

**Layer No. 1: Fill (SM/ML/CL)**

This layer ranges from about 2 to 5 feet thick and extends from the existing grade to approximately EL. + 8 to +10 feet. This layer consists of silty sand, clayey sand, silt, and silty clay at various locations.

**Layer No. 2: Native: Silty Clay Interbedded with Very Thin Layers of Silty Sand**

Layer 2 is comprised of firm to very stiff, clayey silt and silty clay, extending from approximately EL. +8 and +10 feet to approximately EL – 15 feet. The undrained shear strength of this clay ranges between 1 to 2.5 ksf. There are individual layers at various locations between El. -2.5 feet and El. +2.5 feet that are soft to firm with interpreted undrained shear strength of 0.5 to 1 ksf.

**Layer No. 3: Silty Sand and Sand (SM)**

Layer 3 extends from EL. - 15 feet to the maximum depth explored (El. -70 feet). This layer consists of very dense sand and silty sand. The CPT tip resistance for this layer is generally greater than 350 tsf. The SPT blow counts are in general greater than 50.

## 3.2 Groundwater

The groundwater elevation at the site is tide dependant. Based on our field exploration, current groundwater elevations varied between +2 to -3.0 MSL. Based on the CGS Seismic Hazard Zone Report 036 (CGS, 1998), the historical highest groundwater level at the site area was at a depth of 5 feet. The CGS Historically Highest Ground Water Contour is shown in Figure 5.

For design, we recommend that the design groundwater level at this site be taken as El. +5 .0 MSL.

# 4.0 DISCUSSION AND RECOMMENDATIONS

## 4.1 Potential Seismic Hazards

Potential geologic and seismic hazards that may affect any site in southern California include ground surface rupture, seismic shaking, liquefaction, dynamic settlement, tsunamis, and subsidence. These potential hazards are discussed in the following sections.

### 4.1.1 Ground Surface Rupture

The site is not located in an Alquist-Priolo (AP) Special Study Fault Zone. The closest faults to the site are shown in Table 1. A regional fault map is provided in Figure 6.

**Table 1 Summary of Faults Close to the Project Site**

| Fault Name | Fault Type | Maximum Moment Magnitude | Distance to the Project Site (Mile) |
|---|---|---|---|
| **Newport-Inglewood Fault** | RLSS | 7.5 | 4.6 |
| **Santa Monica Fault** | R | 6.6 | 4.4 |
| **Hollywood Fault** | LLSS | 6.6 | 5.4 |
| **Puente Hills Blind Thrust** | R | 7.3 | 9.7 |

Note: Source to site distance is measured as the closest distance from the site to the surface projection of the fault. RLSS – Right Lateral Strike Slip; R – Reverse; LLSS – Left Lateral Strike Slip.

No known active faults are mapped as crossing the site in the geologic literature reviewed. Therefore, the possibility of ground surface fault rupture at the site is considered to be very low.

### 4.1.2 Design Ground Motion Parameters

Design ground motion parameters were developed in accordance with CBC 2010 for the proposed new buildings. The site coordinates used in our seismic hazard analysis are: -118.4413 (Longitude) and 33.9806 (Latitude).

The subsurface soil at this site consists of 25 to 30 feet of stiff clays underlain by dense sands. Based on the shear wave velocity, $V_S$, measurements from CPT-12-07 performed at this site, the subject site has a $V_{S(30)}$ of 976 fps, and is classified as Site Class D, corresponding to a "Stiff Soil" profile.

We used the USGS online web program "Seismic Hazard Curves, Response Parameters, and Design Parameters" (Version 5.1.0 – 2/10/2011) to develop CBC 2010 seismic design parameters. The ground motion design parameters are shown in Table 2.

| **Table 2 Seismic Ground Motion Values** | |
|---|---|
| Latitude: 33.9806 Longitude: -118.4413 | |
| Site Class | D |
| Mapped MCE Spectral Response Acceleration at Short Period ($S_S$) | 1.5 g |
| Mapped MCE Spectral Response Acceleration at Period of 1 Second ($S_1$) | 0.6 g |
| Site Coefficient, $F_a$ | 1 |
| Site Coefficient, $F_V$ | 1.5 |
| Adjusted MCE Spectral Response Acceleration at Short Period ($S_{MS}$) | 1.5 g |
| Adjusted MCE Spectral Response Acceleration at Period of 1 Second ($S_{M1}$) | 0.9 g |
| Design Earthquake Spectral Response Acceleration at Short Period ($S_{DS}$) | 1 g |
| Design Earthquake Spectral Response Acceleration at Period of 1 Second ($S_{D1}$) | 0.6 g |

In accordance with Title 22 of the Los Angeles County Planning and Zoning Ordinance and the Marina Del Rey Specific Plan, Section 22.46.1180, Item 4, new development over three stories in height shall be designed to withstand a seismic event with a ground acceleration of no less than 0.50 g. Since Bldg VII is a 4-story storage rack for boats, this building needs to be designed for a PGA of 0.50 g.

#### 4.1.3 Liquefaction Potential

The subject site is located within a State of California Liquefaction Hazard Study Zone (Figure 7).

Liquefaction involves the sudden loss in strength of a saturated, cohesionless soil (predominantly sand) caused by the build-up of pore water pressure during cyclic loading, such as that produced by an earthquake. This increase in pore water pressure can temporarily transform the soil into a fluid mass, resulting in vertical settlement and can also cause lateral ground deformations. Typically, liquefaction occurs in areas where there are loose sands and the depth to groundwater is less than 50 feet from the surface. Seismic shaking can also cause soil compaction and ground settlement without liquefaction occurring, including settlement of dry sands above the water table.

To assess the potential for liquefaction of soils underlying the site, we used the simplified liquefaction analysis procedure recommended by NCEER (Youd and

Idriss, 1997, 2001). We evaluated the liquefaction potential using actual SPT blow counts from the mud rotary borings. We also performed liquefaction analysis using CPT data. CPT data were used primarily because they provide a continuous measurement of soil resistance and accurate stratigraphy of the site. For estimating the resulting ground settlements, we used the method proposed by Tokimatsu and Seed (1987).

Our liquefaction analysis was performed using the design groundwater level of El. +5 feet, the predominant moment magnitude, $M_W$, of 6.8, and a PGA of 0.40g which is 40% of $S_{DS}$ in accordance with ASCE 7-05. Our liquefaction analysis indicated that some of the interbedded thin layers of silty sand and sandy silt are susceptible to liquefaction during the design earthquake event. The total dynamic settlement varies across from 0 to 1.2 inches. Our liquefaction analysis is included in Appendix C, and a summary of the total dynamic settlement estimated under each proposed building is provided in Table 3.

**Table 3 Summary of Dynamic Settlement under Each Proposed Building**

| Proposed Structure | Discription | Exploration | Total Dynamic Settlement (in) |
|---|---|---|---|
| BLDG. 1 | New Restroom - Single Story | CPT-12-14 | 0.62 |
| BLDG. II | New Grocery Store - Single Story | CPT-12-11 | 0.15 |
| | | CPT12-12 | 0.15 |
| | | CPT-12-13 | 0.98 |
| | | R-12-20 | 0 |
| BLDG. III | New Restroom - Single Story | CPT-12-10 | 0.14 |
| BLDG. IV | Retail Boat Supply Store - 2 story | CPT-12-7 | 0.23 |
| | | CPT-12-8 | 0.22 |
| | | CPT-12-9 | 0.02 |
| | | CPT-12-10 | 0.14 |
| | | R-12-18 | 0 |
| | | R-12-19 | 0 |
| BLDG. V | Boat Broker Office - Single Story | CPT-12-4 | 0.38 |
| | | CPT-12-5 | 0.69 |
| | | CPT-12-6 | 0.36 |
| | | R-12-17 | 0.19 |
| BLDG. VI | Boaters Lounge - Single Story | CPT-12-03 | 0.31 |
| | | R-12-16 | 0.16 |
| BLDG VII | Storage Rack for Boats - single story | CPT-12-1 | 0.38 |
| | | CPT-12-2 | 1.23 |
| | | R-12-15 | 0.21 |

#### 4.1.4 Lateral Spreading

Under cyclic loading, lateral spreading can occur on gently sloping ground or on virtually flat ground adjacent to bodies of water. The subject site is underlain by approximately 25 to 30 feet of firm to stiff clays interbedded with thin layers of silty sands, underlain by very dense sand. The interbedded thin layers of silty sands within the clay layer are susceptible to liquefaction. However, these interbedded thin sandy layers appear to be localized and do not form a continuous liquefiable layer. Therefore, liquefaction induced lateral spreading does not appear to be an issue at this site.

However, for conservatism, we still evaluated the potential for lateral spreading at this site following the screening analysis outlined in SP 117A – Guidelines for Evaluating and Mitigating Seismic Hazards in California (2008). Computer program PCSTBL 5 was used in our analysis. Liquefiable layers were modeled as clay with undrained shear strength equivalent to a post liquefaction residual shear strength. The liquefiable layers were also conservatively assumed to be continuous across the site. Base on our evaluation, the post liquefaction residual shear strength of the liquefied silty sands are mostly greater than 1.0 ksf. Based on the Manual for Preparation of Geotechnical Reports prepared by County of Los Angeles Department of Public Works (dated July 2010), for screening analysis, a horizontal seismic coefficient of 0.15 was use. Our analysis indicated that the factor of safety under seismic event is greater than 1.5. This meets the minimum factor of safety for static conditions and is much higher than the 1.1 factor of safety required for seismic condition. Therefore, liquefaction induced lateral spreading and seismic slope stability is not an issue at this site. The pseudostatic stability analysis is included in Appendix D.

#### 4.1.5 Tsunami

All low-lying areas along California's coast are subject to potentially tsunami inundation. Tsunamis are long-period waves generated primarily from distant and local offshore earthquakes, landslides, or volcanic eruptions. The magnitude of the potential hazard is a function of the coastline configuration, sea floor topography, individual wave characteristics, and distance and direction from the source.

Two tsunamis, induced by the 1960 Chile Earthquake, caused damage in the Los Angeles and Long Beach harbors. In 1960, waves up to 5 feet in height occurred in the Cerritos Channel, and currents up to 12 knots were reported.

Fortunately, the majority of the Southern California coastal areas do not have a significant potential to be inundated as a result of tsunamis. This is because that the predominant faults in Southern California are strike-slip faults, which generate predominantly horizontal motions; and most of the earthquake epicenters are on land (Landers and Lockridge, 1989).

A 5-ft run-up for a 100-year tsunami and an 8-ft run-up for a 500-year tsunami are predicted near the Marina Del Rey area (Ziony, Editor, 1985). The ground surface adjacent to the boat deck is about El. +10 feet. If the tsunami coincides with high tides, the site area maybe flooded.

## 4.2 Foundations

### 4.2.1 General

Due to the light loading conditions with some removal and recompaction, the proposed one and two story wood framed structures can be supported on shallow footings.

### 4.2.2 Subgrade Preparation

Up to 5 feet of old fill was encountered in our field explorations. It should be anticipated that the old fill could vary between boring locations and could be locally deeper. Any old fill should be considered to be uncertified and should not be used for support of the planned structure. Any existing fill should be removed and replaced with properly compacted fill. All removals should extend a minimum of 5 feet outside the building pad and all areas where new improvements will be located.

To provide uniform support for the buildings it should be planned that the building pad should be over excavated and recompacted as structural fill to a minimum depth of 5 feet. The actual limits for all removals should be determined by the project geotechnical engineer during grading, depending on the actual conditions encountered. Footings should be supported by a minimum 3 feet of compacted fill.

The bottom of the excavation should be observed by Group Delta Consultants (GDC) to verify that the foundation conditions are acceptable before backfilling. GDC may perform compaction tests or require proof rolling of the subgrade to verify that the foundations will be supported in competent soils. If loose, disturbed or otherwise unsuitable soils or uncertified fill are encountered, or if the water is allowed to fill the excavation, the disturbed soils shall be removed and replaced with compacted granular fill. Bearing capacity, static settlement, and lateral resistance are discussed below.

#### 4.2.3 Bearing Capacity

Footings should have a minimum width of 18 inches and be embedded a minimum of 18 inches below lowest adjacent grade. Footings should be founded on a minimum of 3 feet of compacted fill. For Footings with the specified minimum width and embedment, an allowable bearing pressure of 2,500 psf may be used. Bearing pressures may be increased by 1/3 for temporary seismic and wind loads.

#### 4.2.4 Settlement

Settlement of the shallow footings will depend on the actual structural loads and footing size. Based on the preliminary structural loads and maximum footing size of 6 feet by 6 feet, we expect that the total static settlement to be on the order of 1.2 inches. In addition to static settlement, the proposed structure should be designed for the potential dynamic settlements as provided in Table 3. Differential settlement (static plus seismic) between adjacent similarly loaded columns is estimated to be on the order of 0.5 inches. Settlement calculations are provided in Table 4.

#### 4.2.5 Lateral Resistance

An allowable passive fluid pressure of 300 pcf and an allowable sliding friction coefficient of 0.35 may be used for design, for foundations and slabs placed in structural fill or in undisturbed, stiff native soils. Both passive and sliding resistance may be used in combination without reduction.

### 4.3 Slab on Grade

The upper 5 feet of the subgrade soils consist predominantly of silty sand and sandy silt that have low expansion potential. However, there are areas within this site that medium expansive clays and clayey sand exists. During grading, this medium expansive clays should be mixed with the onsite sandy soils to mitigate the expansion potential. The mixed soils should have an EI of less than 20, before being placed and compacted.

To reduce the potential for moisture transmission through slabs where moisture sensitive covering will be installed, we recommend that a vapor retarder shall be used. In accordance with ACI 302.2R-06, the material must comply with the requirements of ASTM E 1745, “Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs,” and have a permeance of less than 0.01 perms per ASTM E96. The installation of the moisture barrier should comply with ASTM E 1643-09.

Reference is made to ACI 302.2R, Section 7.2, concerning whether to place 2 inches of sand over the barrier. The benefits and risks associated with the specified location of the vapor retarder should be reviewed by the structural engineer and all appropriate parties.

## 4.4 Minor Retaining Walls

Minor retaining walls less than 4 feet high retaining level backfill for hardscape around the building exterior (if used) may be supported on spread footings. Footings may be designed using an allowable bearing pressure of 1.5 ksf. Footings should be supported on a minimum of 2 feet of compacted fill, compacted to a minimum of 95% relative compaction in accordance with ASTM D 1557-91.

Retaining wall footings on level ground should have a minimum embedment of 18-inches below finish grade. Retaining walls founded on a 2:1 slope should have a minimum embedment of 36-inches below finish grade above the slopeward edge of footing.

We recommend that retaining walls be backfilled with non-expansive granular soils with a PI less than 15 and percent passing No. 200 sieve of less than 15 percent. A 2-ft thick cap consisting of less pervious onsite materials should be used to minimize infiltration of surface water. The finish surface should be graded to drain away from the proposed structures. Heavy compaction equipment operating adjacent to retaining walls can cause excessively high lateral soil pressures to be exerted on the wall. Therefore, soils within 5 feet of the wall should either be compacted with hand operated equipment or designed to withstand compaction pressure from heavy equipment.

Cantilevered walls, which are free to move laterally at least ½ in. for each 10-ft height, may be designed for an equivalent fluid pressure of 38 pcf (with level backfill) or 45 pcf (2:1 sloping backfill). Walls restrained at the top with level backfill should be designed for an equivalent fluid pressure of 55 pcf.

## 4.5 Earthwork and Grading

All grading should conform to the 2010 CBC / County of Los Angeles requirements and the recommendations provided below.

1. The grading contractor is responsible for notifying the project geotechnical engineer of a pre-grading meeting prior to the start of excavation/grading operations and anytime that the operations are resumed after an interruption.

2. The project area should be stripped and cleared of any vegetation. The project civil engineer should locate any existing utilities in the area. Existing utilities should be removed, relocated or protected, as appropriate.

3. Any topsoil should to be removed. Topsoil can be reused in landscape and planter areas.

4. Uncertified fill, if encountered, should be removed and replaced. Any soils disturbed during demolition activities, or soft unsuitable soils encountered during grading should also be removed. All removals should extend a minimum of 5 feet outside building pads / the edges of footings in all directions, and to the limits determined by GDC.

5. The near surface soils underlying the site consist predominantly of sandy soils, temporary excavations in sandier zones will not stand in vertical cuts and should be sloped at 1 (horizontal) to 1 (vertical), or shoring should be used. Where an existing structure, street, or other improvements fall within the 1 to 1 plane projected up from the bottom of the excavation, temporary shoring should also be used.

6. If feasible, the excavated bottom should be proof-rolled with heavy equipment. Any areas of loose or pumping soils should be over excavated at the direction of GDC.

7. Any fill placed under structures or pavement and any backfill placed adjacent to buried walls is “structural fill.” Structural fill should be free of expansive clay, rock greater than 3 inches in maximum size, debris and other deleterious materials. Fill soils should be moisture conditioned to ± 2% of optimum moisture content. All structural fill, except wall backfill, should be compacted to at least 95 percent of the maximum dry density determined by ASTM D 1557-91. Wall backfill and fill placed in non-structural and landscape areas should be compacted to at least 90 percent.

8. Compaction shall be done in maximum 8-inch lifts. All earthwork and grading should be performed under the observation of GDC. Compaction testing of the fill soils shall be performed at the discretion of GDC. Testing should be performed for approximately every 2 feet in fill thickness or 1,000 cubic yards of fill placed, whichever occur first. If specified compaction is not achieved, additional compactive effort, moisture conditioning of the fill soils, and/or removal and recompaction of the below-minimum-compaction soils will be required.

9. Excavation within 2 feet of groundwater may pump; the use of heavy equipment and vibration may create pumping and should be avoided.

10. Buried walls and retaining walls should be backfilled with non-expansive granular soils with a Plastic Index (PI) of less than 15 and with less than 15 percent fines (clay/silt) passing the No. 200 sieve. In addition, a drainage system should also be provided behind the walls as shown in Figure 8.

11. Underground utility trenches below structures and/or pavement should be backfilled with properly compacted fill. Fill should be placed in loose lifts appropriate for the type of compaction equipment utilized. Fill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D1557-91. Jetting or flooding of backfill materials should not be allowed.

12. All materials used for asphalt concrete and aggregate base shall conform to the current version of "Green Book" or the equivalent, and shall be compacted to at least 95 percent relative compaction.

13. If, in the opinion of the geotechnical engineer, contractor, or owner, an unsafe condition is created or encountered during grading, all work in the area shall be suspended until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures, on-site construction, or any off-site properties or persons.

## 4.6 Temporary Excavations and Shoring

### 4.6.1 Temporary Excavation

The near surface soils underlying the site consist predominantly of sandy soils, temporary excavations in sandier zones will not stand in vertical cuts and should be sloped at 1 (horizontal) to 1 (vertical), or shoring should be used. Where an existing structure, street, or other improvements falls within the 2 to 1 plane projected up from the bottom of the excavation, the need for temporary shoring should also be reviewed.

Surcharge loads, such as vehicular traffic, heavy construction equipment, and stockpiled materials, should be kept away from the top of temporary excavations a horizontal distance at least equal to the depth of excavation. Surface drainage should be controlled and prevented from running down the slope face. Ponding water should not be allowed within the excavation. Even with the implementation of the above recommendations, sloughing of slopes and unstable soil zones may still occur within temporary excavations, and workmen should be adequately protected. Construction equipment and foot traffic should be kept off excavation slopes to minimize sloughing.

All excavation slopes and shoring systems should meet the minimum requirements of the Occupational Safety and Health (OSHA) Standards. Maintaining safe and stable slopes on excavations is the responsibility of the contractor and will depend on the nature of the soils and groundwater conditions encountered and his method of excavation. Excavations during construction should be carried out in such a manner that failure or ground movement will not occur. The contractor should perform any additional studies deemed necessary to supplement the information contained in this report for the purpose of planning and executing his excavation plan.

### 4.6.2 Temporary Shoring

Where sandy soils with little fines are present temporary shoring should be planned for vertical excavations. For design of cantilever shoring, an active earth pressure equivalent to a fluid weighing 36 pcf should be used for level ground. The allowable passive pressure may be taken 300 pcf. If soldier piles are used, to account for the rounded shape of the pile, when calculating the passive pressure on individual piles spaced at 3 diameters center to center or wider, the equivalent fluid pressure may be multiplied by a factor of 2. Shoring pressure for braced shoring can be provided if needed.

## 4.7 Site Drainage

The site shall be graded to maintain positive drainage so all runoff is properly collected and conveyed to proper disposal areas in approved storm drains. The area adjacent to foundation should be sloped to drain runoff away and prevent ponding of water.

## 4.8 Utility Installations

The bedding for any new sewer, storm drain and water service pipelines should be a minimum of 4 inches thick and should consist of clean sand, No. 4 concrete aggregate or gravel, and should have a sand equivalent of not less than 30. If wet soils are exposed in the trench, ½ inch gravel should be used for bedding. The pipe zone material, which extends to a level 12 inches above the pipe should consist of sand and should have a sand equivalent of no less than 30, and a maximum rock size of 1 inch. All imported materials should be approved by the project geotechnical engineer before being brought onsite.

Trench zone backfill extends from a level 12 inches above the pipe to finished subgrade. Trench zone material should have a maximum size of 2 inches and should contain no organics or other deleterious materials. All fill soils should be approved by the project geotechnical engineer. Soils proposed to be imported should be approved before being brought on site. As an alternative, slurry can be used as backfill. Where utilities are installed through existing AC pavement, the trench should be capped with AC to match the existing pavement section.

All bedding and backfill materials should be mechanically compacted to at least 90 percent relative compaction. Jetting or flooding of backfill should not be permitted.

## 4.9 Soil Corrosivity

A representative soil sample of the near surface soil from R-12-18 was tested to evaluate corrosion characteristics. The results indicate the test sample had a pH of 8.6, water-soluble sulfate content of 0.02 (percent by weight) and soluble chloride content of less than 0.01 (percent by weight). The sulfate results indicate that sulfate exposure is negligible.

The tested sample was also found to have a minimum measured electrical resistivity of 1562 Ohm-cm. The following correlation can generally be used between electrical resistivity and corrosion potential:

| Elect. Resistivity (Ohm-cm) | Corrosion Potential |
|---|---|
| Less than 1,000 | Severe |
| 1,000-2,000 | Corrosive |
| 2,000-10,000 | Moderate |
| greater than 10,000 | Mild |

On the basis of the laboratory testing, the samples are classified as corrosive for buried metals. Specific assessment concerning the corrosion potential for buried concrete and metals should be made by a corrosion consultants, including options for protection.

## 4.10 Expansion Potential

The upper 5 feet of the subgrade soils at this site consist predominantly of silty sand and sandy silt that have low expansion potential. However, there are areas within this site that medium expansive clays and clayey sand exists. During grading, this medium expansive clays should be mixed with the onsite sandy soils to mitigate the expansion potential. The mixed soils should have an EI of less than 20, before being placed back and compacted.

## 4.11 Pavement Design

Near surface soils at this site consist predominantly of silty sand, sandy silts, with silty clay and sandy clay. These soils will be mixed during grading. Based on the subgrade soil condition, a R-value of 20 may be used for pavement design. The California Division of Highways Design Method was used for design of the recommended pavement sections.

The following pavement sections are recommended for Traffic Index (TI) values of 5, 6, and 7:

**Table 5 Section Thickness of New AC Pavements**

| Traffic Index (TI) | Section Thickness (Feet) AC Over AB |
|---|---|
| 5 | 0.25 AC/0.60 AB |
| 6 | 0.25 AC/0.85 AB |
| 7 | 0.35 AC/0.95 AB |

A traffic Index value 5 is recommended for car parking and non-truck driveways. Traffic index of 6 or higher may be used for truck areas or for the streets. The upper 24 inches of subgrade supporting pavements should be compacted to at least 95 percent relative compaction (ASTM D1557-1990). In areas subjected to high wheel loads or abrasive wheel force, we recommend a pavement section of 6 inches of PCC over 6 inches of aggregate base (CAB or CMB). The aggregate base layer should be compacted to at least 95 percent of its maximum dry density. The asphalt and base should conform to the specifications of the Standard Specifications for Public Works Construction, current Edition ("The Green Book").

## 5.0 SECTION 111 STATEMENT

It is our opinion, based upon our work as outlined above and as referenced, that if constructed in accordance with our recommendations and properly maintained (1) the proposed construction will be safe against hazard from landslide, settlement, or slippage, and that (2) the proposed grading and construction will have no adverse effect on the geologic stability of property outside of the subject site.

## 6.0 POST INVESTIGATION SERVICES

We recommend that final project plans and specifications should be reviewed by GDC to confirm that the full intent of the recommendations presented in this report have been properly applied to the design. During construction, all earthwork should be observed and tested by GDC, including site preparation, excavations, pile installation, load testing, placement of compacted fill and backfill, and installation of drainage systems.

## 7.0 LIMITATIONS

This investigation was performed in accordance with generally accepted geotechnical engineering principles and practice. The professional engineering work and judgments presented in this report meet the standard of care of our profession at this time. No other warranty, expressed or implied, is made. This report has been prepared for the Santry Development, LLC, and their design consultants. It may not contain sufficient information for other parties or other purposes, and should not be used for other projects or other purposes without review and approval by GDC.

The recommendations for this project, to a high degree, are dependent upon proper quality control of site grading, fill and backfill placement, and pile foundation installation. The recommendations are made contingent on the opportunity for GDC to observe the earthwork operations. This firm should be notified of any pertinent changes in the project, or if conditions are encountered in the field, which differ from those described herein. If parties other than GDC are engaged to provide such services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project, and must either concur with the recommendations in this report or provide alternate recommendations.

## 8.0 REFERENCES

California Building Code (CBC) (2010), California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Based on 2006 International Building Code.

California Department of Conservation, Division of Mines and Geology, 1998, "Seismic Hazard Evaluation of the Venice 7.5-Minute Quadrangle, Los Angeles County, Open File Report No. 98-036."

California Division of Mines and Geology, 1990, "Fault-Rupture Hazard Zones in California, Alquist-Priolo Special Studies Zones Act of 1972," Special Publication 42, Department of Conservation, California Division of Mines and Geology.

Ensoft LPILE version 5.0.

Legg M. R., Borrero J. C., and Synolakis C. E. (2002), "Evaluation of Tsunami Risk to Southern California Coastal Cities", the 2002 NEHRP professional fellowship report, published by EERI.

Tokimatsu, K. and Seed, H.B., 1987, "Evaluation of Settlements in Sands Due to Earthquake Shaking," J. of Geotech. Eng. Division, ASCE, Vol. 113, No. 8.

Youd, T. L., et. al., " Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Geoenvironmental Engineering, Vol. 127, No. 10, October 2001.

# TABLES

GROUP DELTA CONSULTANTS

# TABLE 4 SETTLEMENT CALCULATION

**PROJECT NAME:** Marina Del Rey - Restroom **PROJECT NUMBER:** LA-1049

**PROBLEM DESCRIPTION:** Footings Foundation

| Loaded Area | | | | | |
|---|---|---|---|---|---|
| Length, L | 6 | ft | L≥B | | (A) |
| Width, B | 6 | ft | | | (B) |
| Load, Q | 2,500 | psf | | | (C) |
| Depth, D | 2 | ft | must be at a layer boundary | | (D) |
| Settlement Point Loc. | 1 | 1=center, 2=short edge, 3=long edge, 4=corner | | | (E) |

| (1) | (2) | | | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Layer | Depth (feet) top | bottom | center | Layer Height (feet) | $\gamma$ (pcf) | $\sigma'_v$ (psf) | OCR | $\sigma'_p$ (psf) | Stress Distribution $I\sigma$ | $\Delta\sigma$ (psf) | Compress. Type E or C | E (ksf) | Cr / 1+e0 | Cc / 1+e0 | OCR Case | Strain $\varepsilon$ (in/in) | Layer Settle (in) |
| | 0 | 1.5 | 0.75 | 1.5 | 120 | 90 | | | | | | | | | | | |
| | 1.5 | 5 | 3.25 | 3.5 | 120 | 390 | | | 0.9559 | 2,390 | E | 300 | | | N/A | 0.007966 | 0.33 |
| | 5 | 7 | 6 | 2 | 68 | 668 | 1.5 | 1,002 | 0.5489 | 1,372 | C | | 0.01 | 0.0997 | 2 | 0.032549 | 0.78 |
| | 7 | 10 | 8.5 | 3 | 68 | 838 | 1.5 | 1,257 | 0.2996 | 749 | C | | 0.0121 | 0.1242 | 2 | 0.014706 | 0.53 |
| | 10 | 15 | 12.5 | 5 | 68 | 1,110 | 1.5 | 1,665 | 0.1372 | 343 | C | | 0.0121 | 0.1242 | 1 | 0.001415 | 0.08 |
| | 15 | 20 | 17.5 | 5 | 68 | 1,450 | 1.5 | 2,175 | 0.0673 | 168 | C | | 0.0159 | 0.1242 | 1 | 0.000758 | 0.05 |
| | 20 | 22.5 | 21.25 | 2.5 | 68 | 1,705 | 1.5 | 2,558 | 0.0446 | 111 | C | | 0.0189 | 0.1242 | 1 | 0.00052 | 0.02 |
| | 22.5 | 25 | 23.75 | 2.5 | 68 | 1,875 | 1.5 | 2,813 | 0.0352 | 88 | C | | 0.0171 | 0.1166 | 1 | 0.000341 | 0.01 |
| | 25 | 50 | 37.5 | 25 | 120 | 3,460 | | | 0.0135 | 34 | E | 1200 | | | N/A | 2.81E-05 | 0.01 |
| | | | | | | | | | | | | | | | | TOTAL= | 1.2 inches |

# TABLE 1 SETTLEMENT CALCULATION

**INSTRUCTIONS:**

| | |
|---|---|
| **1** | Program calculates settlement under center, short edge, long edge, or corner of shaded rectangular loaded areas, using Boussinesq stress distribution and consolidation theory or elastic modulus compressibility. |
| **2** | Input data in shaded fields. Unshaded fields are automatically calculated. Up to 26 soil layers may be used. |
| **3** | Explanation of the calculation procedure and guidance for input of data in rows (A) through (E) and columns (1) through (16) is provided below. |

**ROW AND COLUMN NOTES**

| | |
|---|---|
| **(A)** | Input length (long side) of rectangular loaded area. |
| **(B)** | Input width (short side) of rectangular loaded area. |
| **(C)** | Input applied load at the base of the loaded area (pounds per square foot) |
| **(D)** | Input depth of applied load below the ground surface (the depth must coincide with a bottom-of-layer boundary specified in Column (2) |
| **(E)** | Input 1, 2, 3, or 4 to calculate the settlement under the center, midpoint of short edge, midpoint of long edge, or corner, respectively, of the rectangular loaded area. |
| **(1)** | Input Soil Layer number and/or description (optional). |
| **(2)** | Starting with the ground surface (depth = 0) input the depth to top and bottom of each soil layer below the ground surface. The depth to center of the layer is automatically calculated. |
| **(3)** | The layer height or thickness is automatically computed (H=depth to top of layer minus depth to bottom of layer). |
| **(4)** | Input unit weight of soil in the layer (total unit weight above the water table, buoyant unit weight below the water table). |
| **(5)** | Vertical effective stress (pounds per square foot) at the center of each layer prior to the new loading is automatically computed. |
| **(6)** | Input Overconsolidation Ratio (OCR) defined as the ratio of maximum past preconsolidation pressure (column (7)) to current effective vertical stress (Column (5)). OCR=1 is Normally Consolidated. |
| **(7)** | Maximum past preconsolidation pressure is calculated as the product of Column (5) and Column (6), or $\sigma'_p$ = OCR * $\sigma'_v$. |
| **(8)** | The stress increase coefficient ($I\sigma$) at the center of each layer is computed using Newmark integration of Boussinesq theory based on vertical depth below bottom of loaded area and position on loaded area input in Row E. |
| **(9)** | The increase in stress ($\Delta\sigma$) at the center of each layer due to the loaded area is computed as the product of $I\sigma$ (Column (8)) and load Q (Row (C)). |
| **(10)** | Input compressibility type for each layer. "E" means elastic modulus (slope of stress versus strain curve) is used, "C" means consolidation theory is used (slope of log stress versus strain curve) is used. |
| **(11)** | Input elastic modulus (E in ksf) value for each layer where "E" is selected in Column 10. |
| **(12)** | Input Recompression Ratio, or slope of log stress versus strain curve, in the overconsolidated range (if soil is normally consolidated this value need not be input). |
| **(13)** | Input Virgin Compression Ratio, or slope of log stress versus strain curve, in the normally consolidated range. |
| **(14)** | Virgin and/or Recomp. Case determined ("C" Comp. Type Only). Case 1 = entire loading is within recompression range, Case 2 - Loading patially recompression partially virgin, Case 3 - entirely virgin (norm cons.) |
| **(15)** | Strain $\varepsilon$ is calculated as $\Delta\sigma$ / E if "E" is specified in Column (10), or by consolidation theory using the appropriate recompression and/or virgin slopes if "C" is specified in Column (10). |
| **(16)** | Layer settlement (inches) is computed as Strain (Column (15)) times Height (Column (3) converted to inches). Total settlement (inches) of all layers is summed up at the bottom of Column (16). |

# FIGURES

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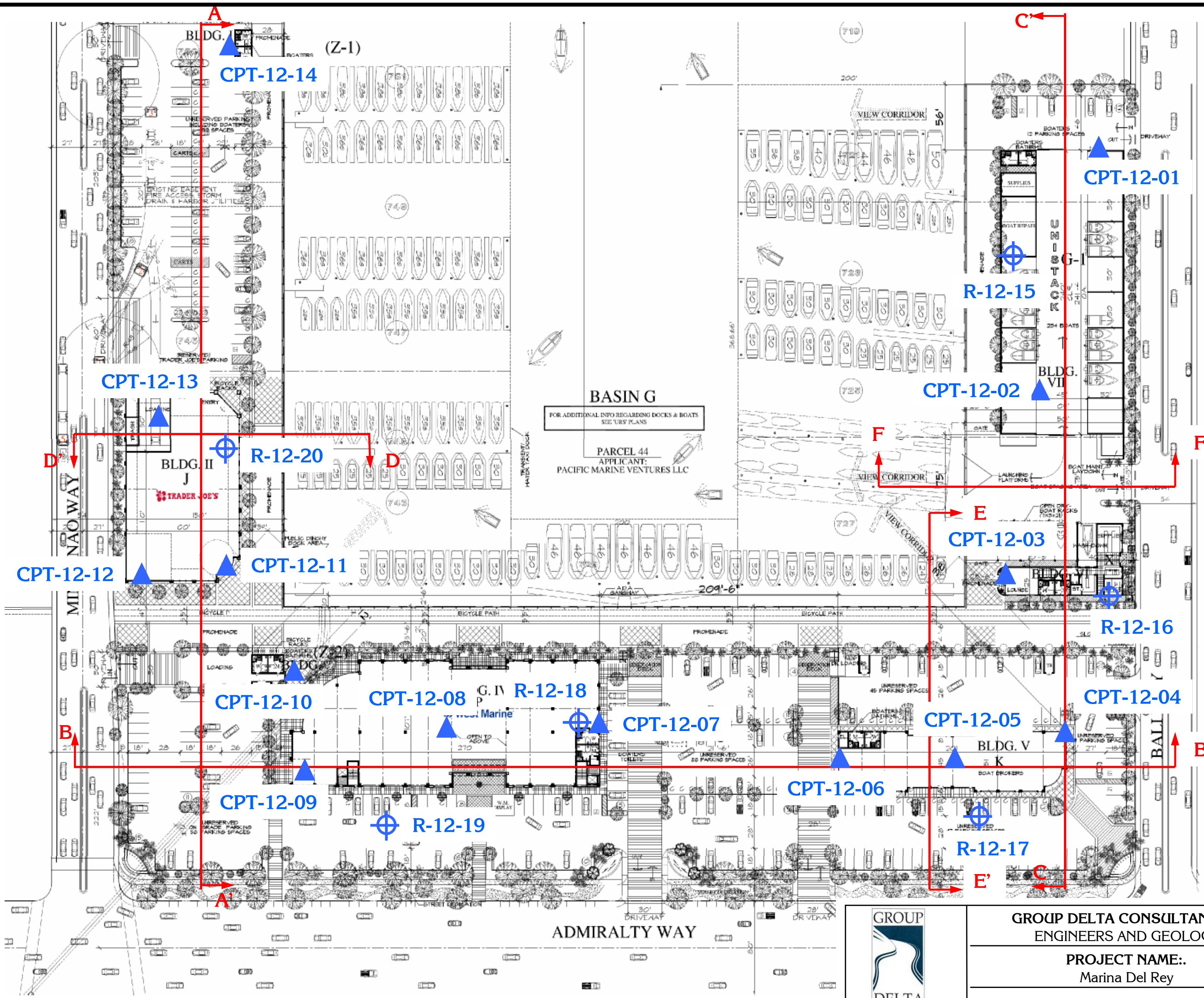
DELTA
CONSULTANTS

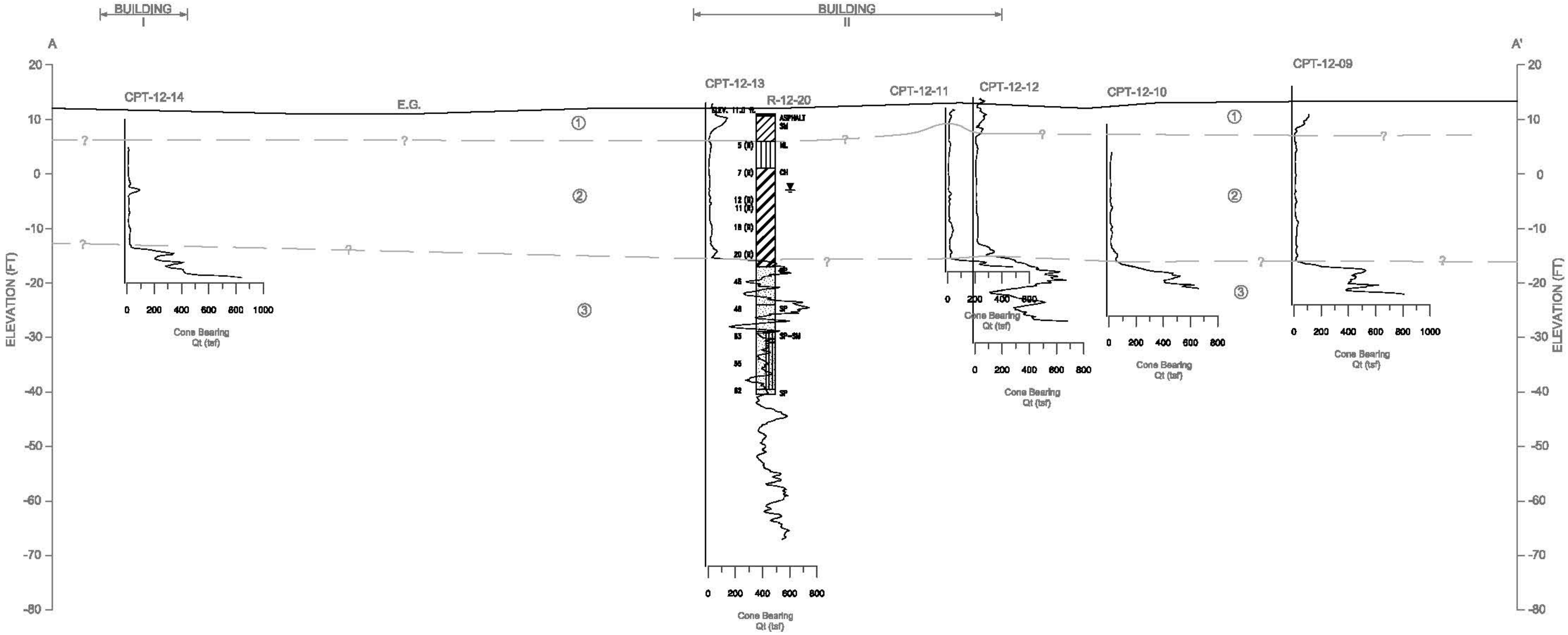

3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS

750 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84

| | | |
|---|---|---|
| GROUP DELTA CONSULTANTS | **GROUP DELTA CONSULTANTS, INC.**<br>ENGINEERS AND GEOLOGISTS | **FIGURE NUMBER**<br>1 |
| | **PROJECT NAME:**<br>Marina Del Rey – Parcel 44 | **PROJECT NUMBER**<br>**LA-1049** |
| | **VICINITY MAP** | |




| GROUP DELTA CONSULTANTS | GROUP DELTA CONSULTANTS, INC.<br>ENGINEERS AND GEOLOGISTS | FIGURE NUMBER.<br>2 |
|---|---|---|
| | PROJECT NAME:.<br>Marina Del Rey | PROJECT NUMBER<br>LA-1049 |
| | Boring Locations | |




SOIL LAYERING

1. Fill
2. Clay and Silt interbedded with very thin layers of Silty Sand
3. Dense to Very Dense Sand and Gravel

LEGEND

| | |
|---|---|
| 25 | Standard Penetration Test (spt) N-value |
| 25(R) | California modified blow count |
| —?— | Interpreted layer boundary |
| E.G. | Existing grade |
| ▼ | Approximate groundwater table |

GRAPHIC SCALE

VER. 1" = 20'

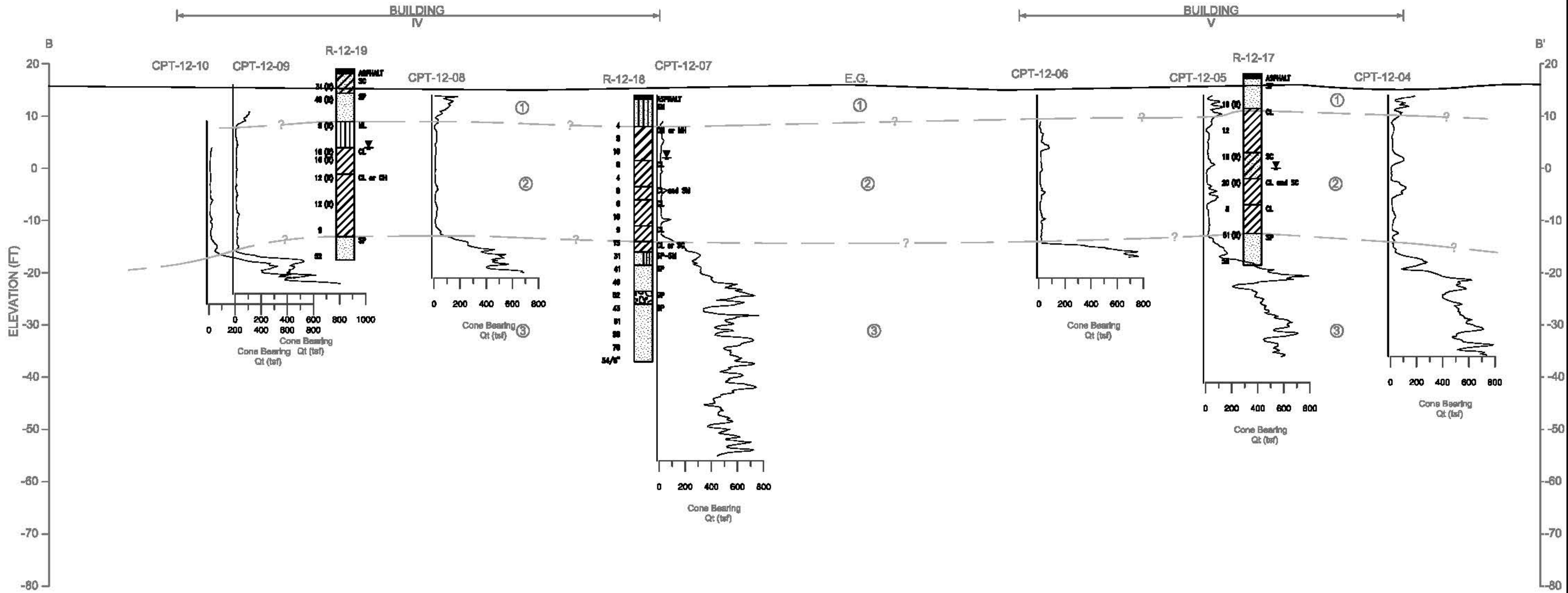
HOR. 1" = 60'

| | | | | |
|---|---|---|---|---|
| DATE: 3/7/12 | DRAWN BY: A. Helma | GROUP DELTA CONSULTANTS | GROUP DELTA CONSULTANTS, INC<br>370 Amapola Avenue<br>Suite 212<br>Torrance, CA 90501 | CROSS SECTION A-A' |
| REVISION: | APPROVED BY: N. Briffa | | | Parcel 44<br>Marina Del Rey, California |
| REVISION: | | | | |

PROJECT NUMBER: LA-1049

SCALE: AS SHOWN

FIGURE NUMBER: 3A




SOIL LAYERING

① Fill

② Clay and Silt interbedded with very thin layers of Silty Sand

③ Dense to Very Dense Sand and Gravel

LEGEND

| | |
|---|---|
| 25 | Standard Penetration Test (spt) N-value |
| 25(R) | California modified blow count |
| —?— | Interpreted layer boundary |
| E.G. | Existing grade |
| ▼ | Approximate groundwater table |

GRAPHIC SCALE

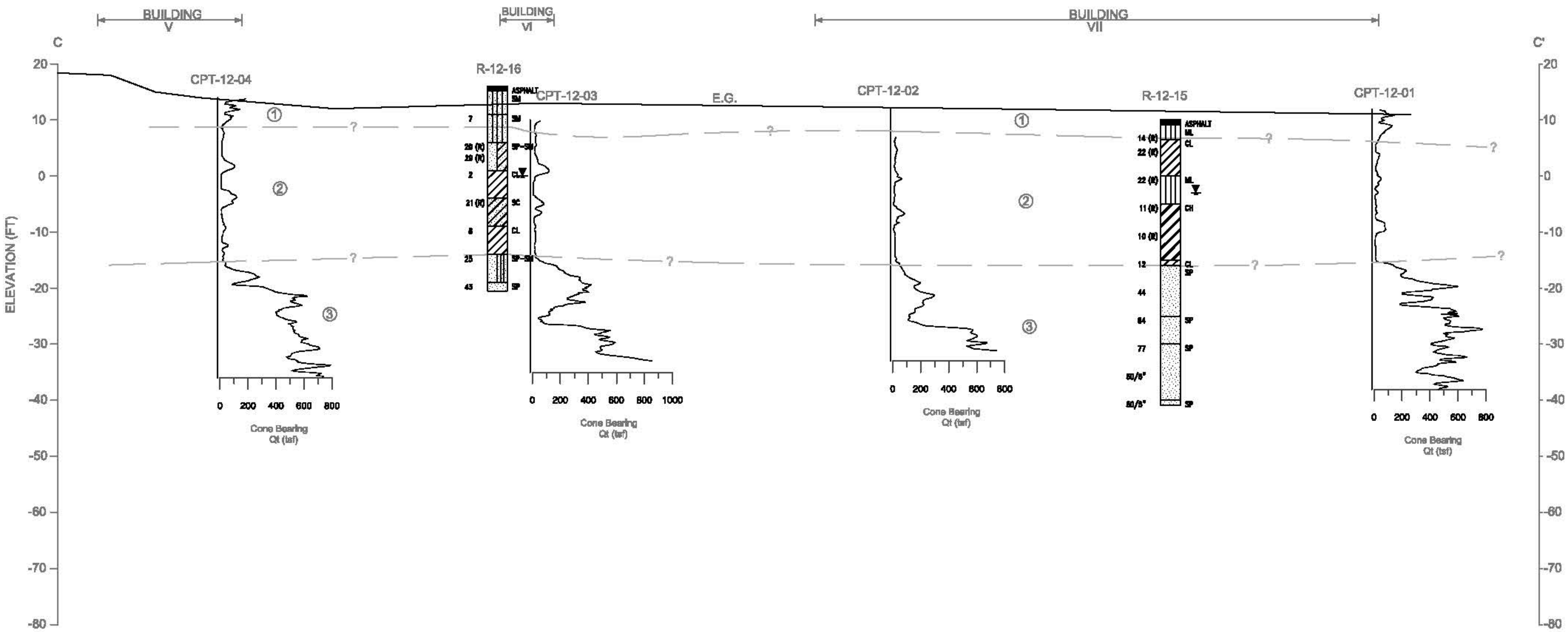
VER. 1" = 20'

0 10 20'

0 30 60

HOR. 1" = 60'

| | | | | | |
|---|---|---|---|---|---|
| DATE: 3/7/12 | DRAWN BY: A. Helma | GROUP DELTA CONSULTANTS | GROUP DELTA CONSULTANTS, INC<br>370 Amapola Avenue<br>Suite 212<br>Torrance, CA 90501 | CROSS SECTION B-B' | PROJECT NUMBER: LA-1049 |
| REVISION: | APPROVED BY: N. Briffa | | | Parcel 44<br>Marina Del Rey, California | SCALE: AS SHOWN |
| REVISION: | | | | | FIGURE NUMBER: 3B |



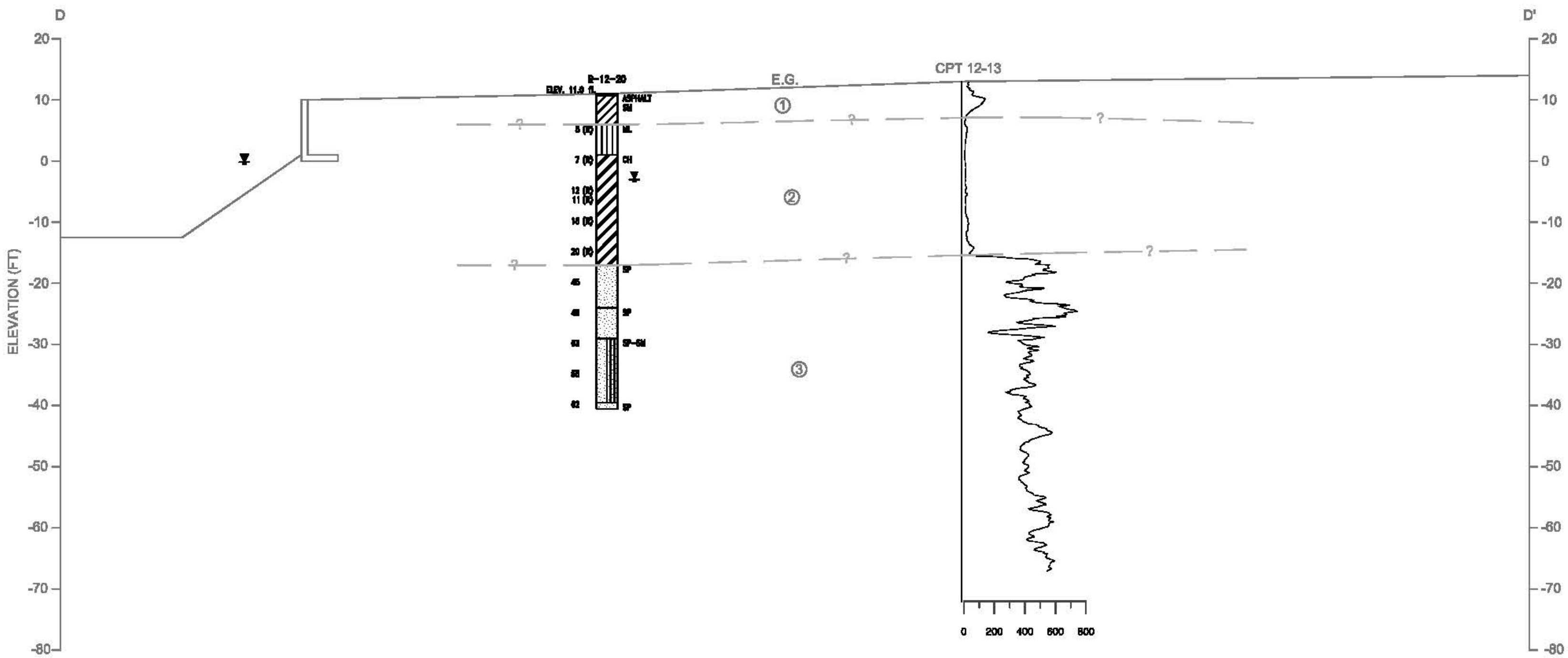

SOIL LAYERING
① Fill
② Clay and Silt interbedded with very thin layers of Silty Sand
③ Dense to Very Dense Sand and Gravel

LEGEND

| | |
|---|---|
| 25 | Standard Penetration Test (spt) N-value |
| 25(R) | California modified blow count |
| —?— | Interpreted layer boundary |
| E.G. | Existing grade |
| ▼ | Approximate groundwater table |

GRAPHIC SCALE
VER. 1" = 20'
0 10 20'
0 25 50
HOR. 1" = 50'

| DATE: 3/7/12 | DRAWN BY: A. Helma | GROUP DELTA CONSULTANTS | GROUP DELTA CONSULTANTS, INC 370 Amapola Avenue Suite 212 Torrance, CA 90501 | CROSS SECTION C-C' | PROJECT NUMBER: LA-1049 |
|---|---|---|---|---|---|
| REVISION: | APPROVED BY: N. Briffa | | | Parcel 44 Marina Del Rey, California | SCALE: AS SHOWN |
| REVISION: | | | | | FIGURE NUMBER: 3C |




SOIL LAYERING

① Fill

② Clay and Silt Interbedded with very thin layers of Silty Sand

③ Dense to Very Dense Sand and Gravel

LEGEND

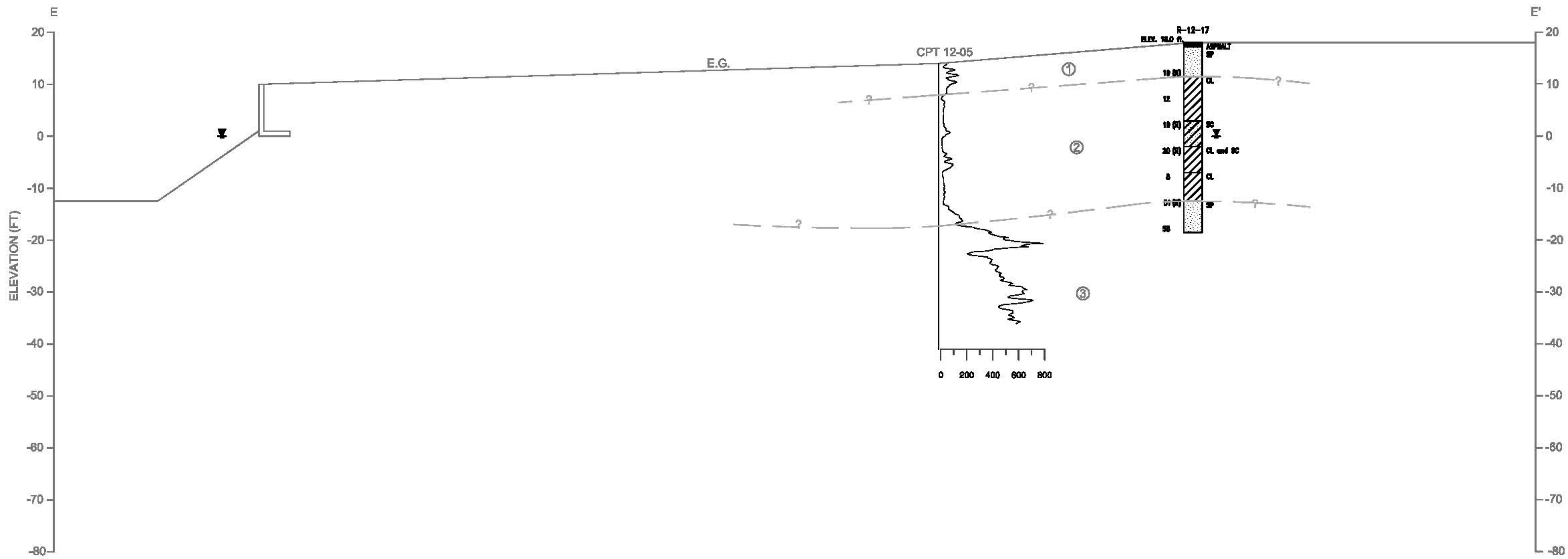
| | |
|---|---|
| 25 | Standard Penetration Test (spt) N-value |
| 25(R) | California modified blow count |
| —?— | Interpreted layer boundary |
| E.G. | Existing grade |
| | Approximate groundwater table |

1" = 20'

0 10 20'

GRAPHIC SCALE

| | | | | |
|---|---|---|---|---|
| DATE: 3/27/12 | DRAWN BY: A. Helma | GROUP DELTA CONSULTANTS, INC<br>370 Amapola Ave.<br>Suite 212<br>Torrance, CA. 90501 | CROSS SECTION D-D' | PROJECT NUMBER: LA1049 |
| REVISION: | APPROVED BY: N. Briffa | | Parcel 44<br>Marina Del Rey, CA | SCALE: AS SHOWN |
| REVISION: | | | | FIGURE NUMBER: 3D |



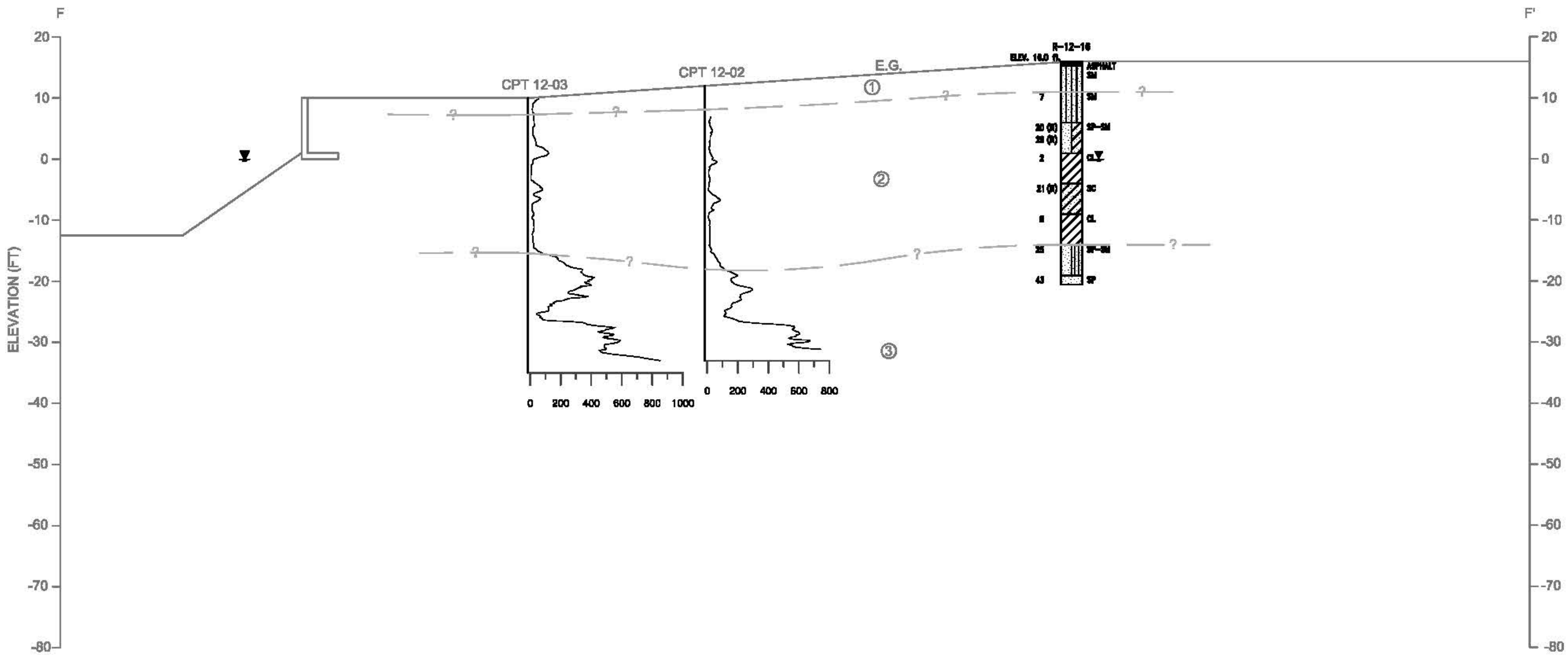

SOIL LAYERING
① Fill
② Clay and Silt Interbedded with very thin layers of Silty Sand
③ Dense to Very Dense Sand and Gravel

LEGEND

| | |
|---|---|
| 25 | Standard Penetration Test (spt) N-value |
| 25(R) | California modified blow count |
| —?— | Interpreted layer boundary |
| E.G. | Existing grade |
| ▼ | Approximate groundwater table |

1" = 20'
0 10 20'
GRAPHIC SCALE

| DATE: 3/27/12 | DRAWN BY: A. Helma | GROUP DELTA CONSULTANTS, INC<br>370 Amapola Ave.<br>Suite 212<br>Torrance, CA. 90501 | CROSS SECTION E-E' | PROJECT NUMBER: LA1049 |
|---|---|---|---|---|
| REVISION: | APPROVED BY: N. Briffa | | Parcel 44<br>Marina Del Rey, CA | SCALE: AS SHOWN |
| REVISION: | | | | FIGURE NUMBER: 3E |




SOIL LAYERING
① Fill
② Clay and Silt Interbedded with very thin layers of Silty Sand
③ Dense to Very Dense Sand and Gravel

LEGEND

| | |
|---|---|
| 25 | Standard Penetration Test (spt) N-value |
| 25(R) | California modified blow count |
| —?— | Interpreted layer boundary |
| E.G. | Existing grade |
| ▼ | Approximate groundwater table |

1" = 20'
0 10 20'
GRAPHIC SCALE

| | | | | | |
|---|---|---|---|---|---|
| DATE: 3/27/12 | DRAWN BY: A. Helma | GROUP DELTA CONSULTANTS | GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501 | CROSS SECTION F-F' | PROJECT NUMBER: LA1049 |
| REVISION: | APPROVED BY: N. Briffa | | | Parcel 44 Marina Del Rey, CA | SCALE: AS SHOWN |
| REVISION: | | | | | FIGURE NUMBER: 3F |


Regional Geology Map

Project Number: L-1049

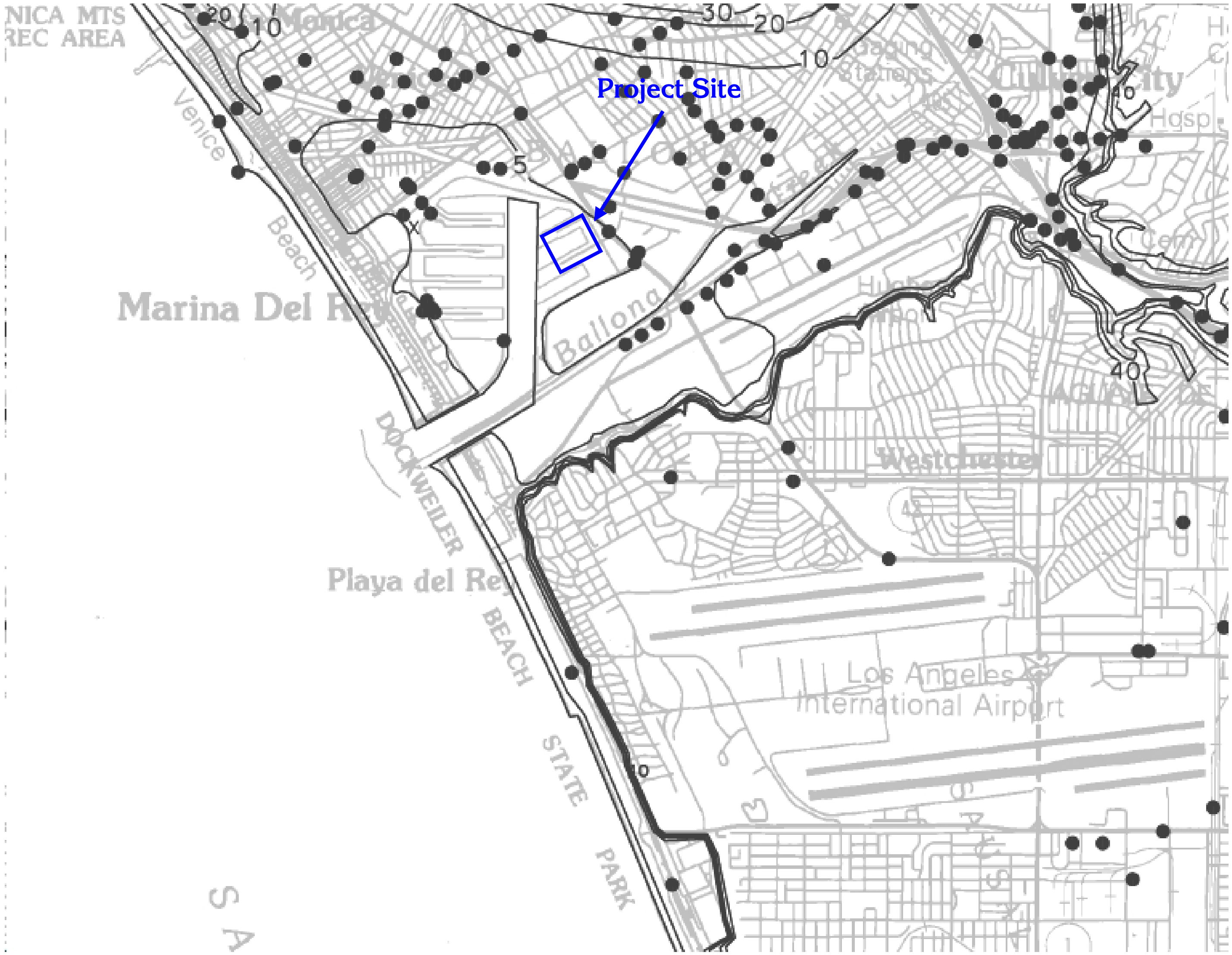
Date: 4/9/2012

GROUP DELTA CONSULTANTS

Group Delta Consultants. INC.
370 Amapola Avenue
Torrance, California 90501

Marina del Rey – Parcel 44

Figure 4




Historical Groundwater Map

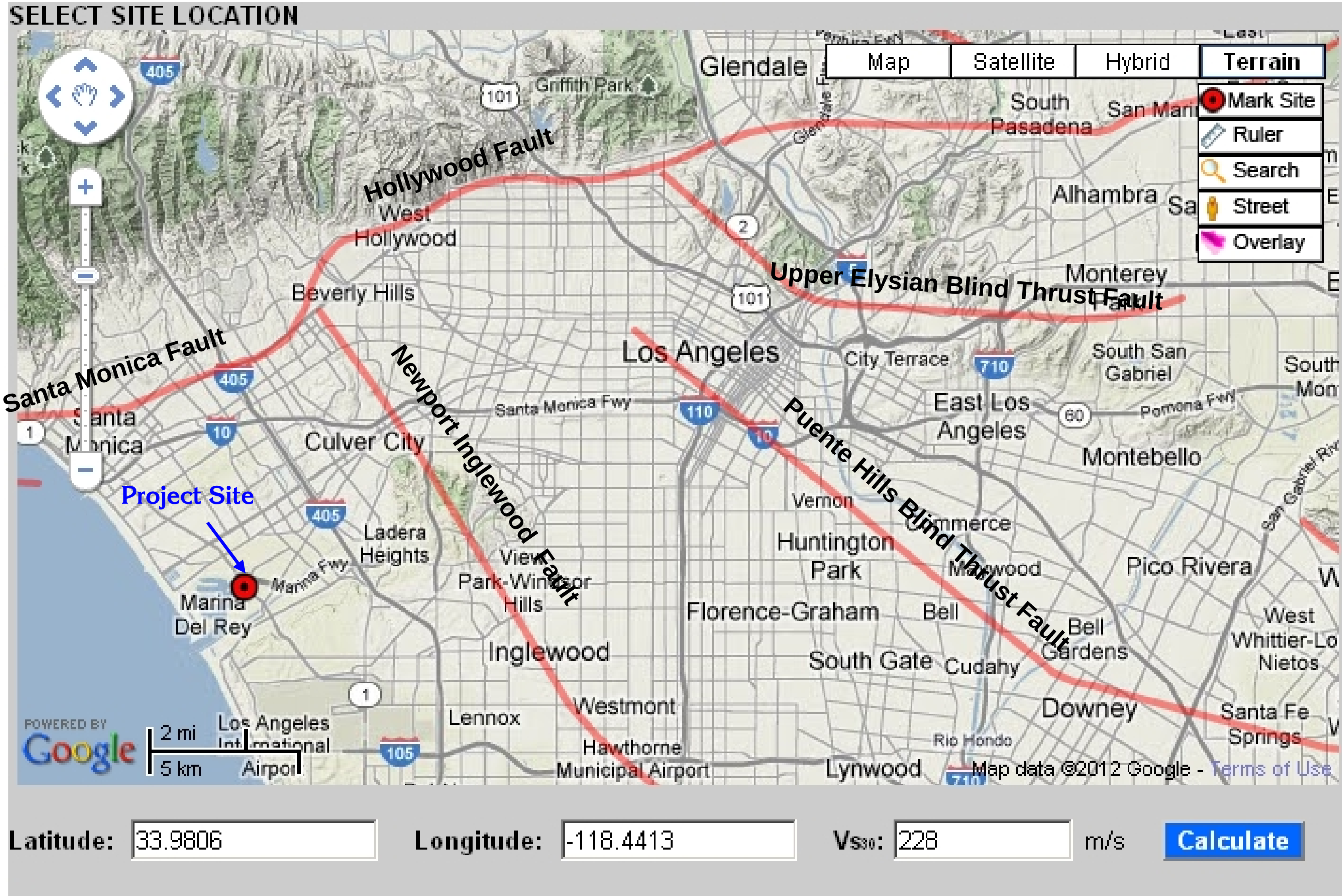
Project Number: L-1049

Date: 4/9/2012

Group Delta Consultants. INC.
370 Amapola Avenue
Torrance, California 90501

Marina del Rey – Parcel 44

Figure 5




| | | |
|---|---|---|
| GROUP DELTA CONSULTANTS | Regional Fault Map | Project Number: L-1049<br>Date: 4/9/2012 |
| | Group Delta Consultants. INC.<br>370 Amapola Avenue<br>Torrance, California 90501 — Marina del Rey – Parcel 44 | Figure 6 |


Liquefaction Hazard Study Zone

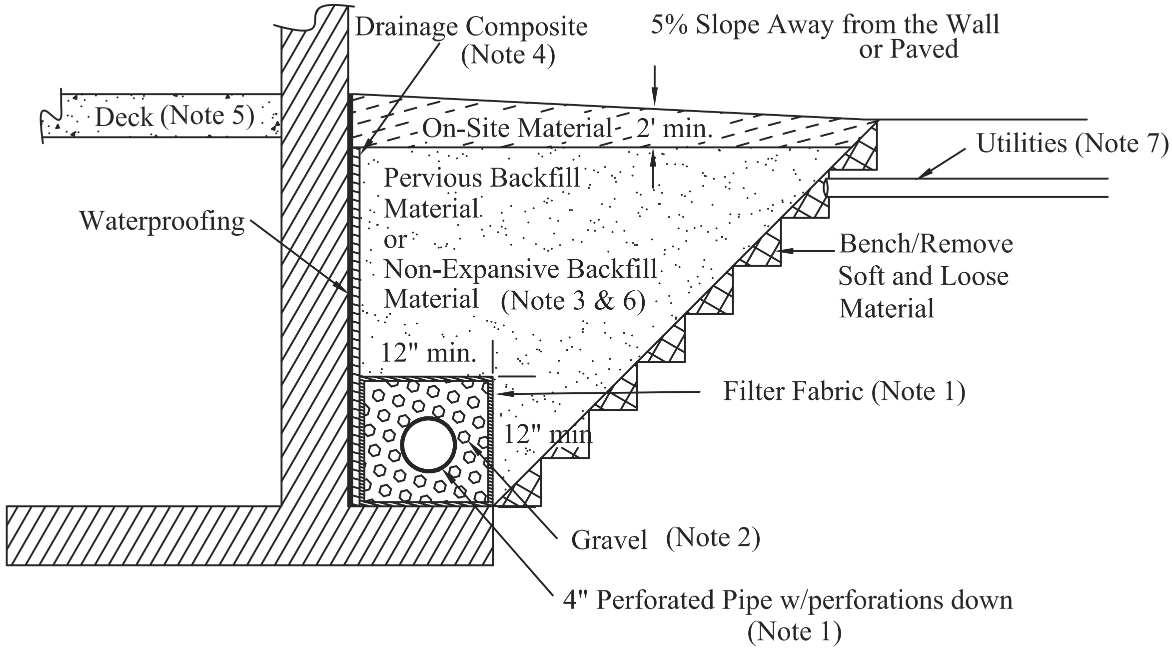
Project Number: L-1049

Date: 4/9/2012

Group Delta Consultants. INC.
370 Amapola Avenue
Torrance, California 90501

Marina del Rey – Parcel 44

Figure 7




NOTES

1) Perforated pipe should be an ASTM standard Acrylonitrile Butadiene Styrene (ABS), Polyvinyl Chloride (PVC), or Polyethylene (PE) with a 0.25% slope for drainage and wrapped with a filter fabric (Mirafi 140 or equivalent).

2) Gravel - 3/8" or 3/4" gravel

3) If no drainage composite is used, Pervious Backfill material should be used above the gravel zone. Pervious Material should be meet Public Works Standard (Greenbook 2000, 3.0.0-3.5.2) as follows:

100% passing 3/4"
80-100% passing 3/8"
0-8% passing -100 sieve
0-3% passing -200 sieve

4) If a drainage composite is used, non expansive backfill material may be used above the gravel zone. Drainage Composite Material should be MiraDrain 6000 material or equivalent. Backfill should have an EI<20 and conform to Group Delta Grading and Backfill Recommendations.

5) If the wall is supported by the deck, no backfill shall be placed before the deck is constructed and a structural engineer's approval is given.

6) No heavy equipment or compaction equipment should be used above the perforated pipe, or within 8 feet of the wall. Only hand compaction equipment should be used above adjacent to the walls.

7) Utility Laterals - Remove loose material and hand compact backfill or use 2-sack sand/cement slurry.

# Retaining Wall Backfill

Marina del Rey - Parcel 44

PROJECT NUMBER: LA-1049
DATE: 4/9/2012
SCALE: Not To Scale
DRAWN BY: A Helma
APPROVED BY: Y Liu
REVISED:
FIGURE: 8

GROUP DELTA CONSULTANTS, INC.

N:\Projects\1000-1099\L-1047 NBC Universal Technicolor New Report\Drawings\L-1047 Fig 11 wall_backfill.dwg

# APPENDIX A
# FIELD EXPLORATION

## APPENDIX A
## FIELD EXPLORATION

The subsurface conditions at the site were investigated between February 23, 2012 and March 2, 2012. The field exploration program included drilling 6 mud rotary wash borings and performing 14 Cone Penetration Test (CPT) probes. The locations of explorations are shown in Figure 2 of the main report.

The borings and CPTs were advanced to depths ranging from 29 to 80 feet below the existing grades. The explorations were performed under the continuous technical supervision of our field engineer, who also maintained detailed logs of the soils encountered, classified the materials, and assisted in obtaining soil samples. Subsurface materials encountered in the borings were visually classified and logged in accordance with the Unified Soil Classification System (USCS). Logs of the borings are presented in Figures A-2 to A-7.

Relatively undisturbed modified California ring samples and Standard Penetration Test (SPT) samples were taken in the borings at depth intervals of 2.5 feet and 5 feet. In addition, representative bulk samples were taken within the upper 5 feet. The locations of samples are indicated on the boring logs. The relatively undisturbed samples were obtained with a 3-inch O.D. split-barrel sampler lined with 1-inch high brass rings. The sampler was driven into the soil using a 140-pound hammer falling a distance of 30 inches. The number of blows required to drive the sampler 12 inches into the soil is recorded on the boring logs.

The Standard Penetration Tests (SPT) were conducted in accordance with ASTM D 1586, using a standard 2-inch outside diameter, 1.375-inch inside diameter, split-spoon sampler. The SPT sampler was driven into the soil using a 140-pound hammer free-falling 30 inches. The N-value blow counts are shown directly on the boring logs.

All samples were sealed to prevent moisture loss and returned to our laboratory for additional visual examination and laboratory testing. A discussion of the laboratory testing program, including test results, is provided in Appendix B.

The CPT probes were performed in general accordance with ASTM D5778 using a 30-ton CPT Rig provided by Kehoe Testing and Engineering, Huntington Beach, CA. A CPT sounding is performed by pushing a conical tipped steel probe with a cylindrical friction sleeve into soil while simultaneously recording the end bearing and side friction resistance. The conical tip had a 60-degree apex angle and a projected cross sectional area of 15 $cm^2$ and is advanced with a hydraulic ram. The cylindrical friction sleeve has a surface area of 225 $cm^2$. Both the tip and sleeve have outside diameters of 4.37 cm.

As the probe is advanced, electronic instruments measure and record both the tip resistance and the frictional resistance on the sleeve. The tip and frictional resistance are then analyzed, using available correlations, to estimate soil classification, density, strength and compressibility of subsurface materials. Unlike soil borings, in which drive samples are generally taken every 2.5 to 5 feet, CPT soundings provide a near continuous record of soil properties with depth by recording the parameters at approximately 1 inch intervals. Logs of the CPT probes are presented in Figures A-8 to A-21.

The following are attached and complete this appendix:

| | |
|---|---|
| Figure A-0 | Key for Soil Classification |
| Figure A-1 | Legend for Log of Test Borings |
| Figures A-2 to A-7 | Logs of Borings |
| Figures A-8 to A-21 | CPT Logs |

# KEY FOR SOIL CLASSIFICATION

## UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

| ***PRIMARY DIVISIONS*** | | | ***GROUP SYMBOL*** | ***SECONDARY DIVISIONS*** |
|---|---|---|---|---|
| COARSE GRAINED SOILS (less than 50% fines passing the No. 200 Sieve) | GRAVEL (% GRAVEL > % SAND) | CLEAN GRAVEL (Less than 5% fines) | GW | Well-graded gravel, gravel with sand, little or no fines |
| | | | GP | Poorly-graded gravel, gravel with sand, little or no fines |
| | | "DIRTY" GRAVEL (More than 12% fines) | GM | Silty gravel, silty gravel with sand, silty or non-plastic fines |
| | | | GC | Clayey gravel, clayey gravel with sand, clayey or plastic fines |
| | SAND (% SAND ≥ % GRAVEL) | CLEAN SAND (Less than 5% fines) | SW | Well-graded sand, sand with gravel, little or no fines |
| | | | SP | Poorly-graded sand, sand with gravel, little or no fines |
| | | "DIRTY" SAND (More than 12% fines) | SM | Silty sand, silty sand with gravel, silty or non-plastic fines |
| | | | SC | Clayey sand, clayey sand with gravel, clayey or plastic fines |
| FINE GRAINED SOILS (50% or more fines passing the No. 200 Sieve) | SILTS AND CLAYS (Liquid Limit less than 50) | | ML | Inorganic silt, sandy silt, gravelly silt, or clayey silt with low plasticity |
| | | | CL | Inorganic clay of low to medium plasticity, sandy clay, gravelly clay, silty clay, Lean Clay |
| | | | OL | Low to medium plasticity Silt or Clay with significant organic content (vegetative matter) |
| | SILTS AND CLAYS (Liquid Limit 50 or more) | | MH | Inorganic elastic silt, sandy silt, gravelly silt, or clayey silt of medium to high plasticity |
| | | | CH | Inorganic clay of high plasticity, Fat Clay |
| | | | OH | Medium to high plasticity Silt or Clay with significant organic content (vegetative matter) |
| HIGHLY ORGANIC SOILS | | | PT | Peat or other highly organic soils |

**Note:** Dual symbols are used for coarse grained soils with 5 to 12% fines (ex: SP-SM), and for soils with Atterberg Limits falling in the CL-ML band in the Plasticity Chart. Borderline classifications between groups may be indicated by two symbols separated by a slash (ex: CL/CH, SW/GW).

## CONSISTENCY CLASSIFICATION

| ***COARSE GRAINED SOILS*** | | ***FINE GRAINED SOILS*** | | |
|---|---|---|---|---|
| Blowcount SPT[1] (CAL)[2] | Consistency | Blowcount[3] SPT[1] (CAL)[2] | Consistency | Undrained Shear Strenth[3], $S_u$ (ksf) |
| 0-4 (0-6) | Very Loose | <2 (<3) | Very Soft | < 0.25 |
| | | 2-4 (3-6) | Soft | 0.25 -0.50 |
| 5-10 (7-15) | Loose | 5-8 (7-12) | Firm | 0.50 - 1.0 |
| 11-30 (16-45) | Med. Dense | 9-15 (13-22) | Stiff | 1.0 - 1.5 |
| 31-50 (46-75) | Dense | 16-30 (23-45) | Very Stiff | 1.5 - 2.0 |
| >50 (>75) | Very Dense | >31 (>45) | Hard | >2.0 |

## MOISTURE CLASSIFICATION

**DRY -** Absence of moisture, dusty, dry to the touch
**MOIST-** Damp but no visible water
**WET-** Visible free water, usually soil is below water table

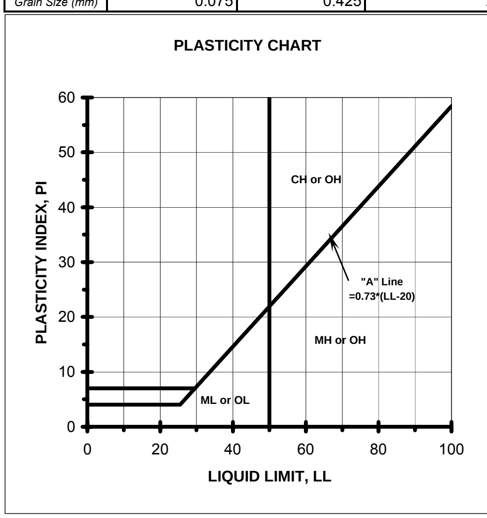
**CONSISTENCY NOTES:**

1. Number of blows of a 140-lb. hammer falling 30-inches to drive a 2-inch OD (1.375-inch ID) **SPT Sampler** [ASTM D-1585] the final 12-inches of driving
2. Number of blows of a 140-lb. hammer falling 30-inches to drive a 3-inch OD (2.42-inch ID) **California Ring Sampler** the final 12-inches of driving.
3. Undrained shear strength of cohesive soils predicted from field blowcounts is generally unreliable. Where possible, consistency should be based on $S_u$ data from pocket penetrometer, torvane, or laboratory testing.

## CLASSIFICATION CRITERIA BASED ON LABORATORY TESTS

***Grain Size Classification***

| CLAY AND SILT | | SAND | | | GRAVEL | | COBBLES | | BOULDERS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Fine | Medium | Coarse | Fine | Coarse | | | | |
| *US Std Sieve* | **No. 200** | **No. 40** | **No. 10** | **No. 4** | **3/4"** | **3"** | | **12"** | | |
| *Grain Size (mm)* | 0.075 | 0.425 | 2 | 4.75 | 19.1 | 76.2 | | 304.8 | | |




*Classification of earth materials shown on the logs is based on field inspection and should not be construed to imply laboratory analysis unless so stated.*

**Granular Soil Gradation Parameters**

Coefficient of Uniformity: $C_u = D_{60} / D_{10}$

Coefficient of Curvature: $C_C = (D_{30})^2 / (D_{10} \times D_{60})$

$D_{10}$= 10% of the soil is finer than this diameter

$D_{30}$= 30% of the soil is finer than this diameter

$D_{30}$= 60% of the soil is finer than this diameter

| **Group Symbol** | **Gradation or Plasticity Requirement** |
|---|---|
| SW | $C_u$>6 and $C_c$ between 1 and 3 |
| GW | $C_u$>4 and $C_c$ between 1 and 3 |
| GP or SP | Clean gravel or sand not meeting requirement for GW or SW |
| GM or SM | Plots below "A" Line on Plasticity Chart or PI < 4 |
| GC or SC | Plots above "A" Line on Plasticity Chart and PI > 7 |

# LOG OF TEST BORING

| | | | |
|---|---|---|---|
| PROJECT NAME: Marina Del Rey - Parcel 44 | PROJECT NUMBER: LA-1049 | BORING: LEGEND | |
| SITE LOCATION: Pier 44, Marina Del Rey | START: | FINISH: | SHEET NO.: 1 of 1 |
| DRILLING COMPANY: Socal Drilling | DRILLING METHOD: Rotary Wash | LOGGED BY: . | CHECKED BY: . |
| DRILLING EQUIPMENT: Mayhew 1000 | BORING DIA. (in): 5" | TOTAL DEPTH (ft): . | GROUND ELEV (ft): |
| DEPTH/*ELEV.* GROUND WATER (ft): ▼ / *na* | | | |
| SAMPLING METHOD: SPT & Cal. Mod. | NOTES: | | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | BULK, CAL, SPT - Refers to the sampling method as described below |
| 5 | | | B-1 | | | | | | | | | BULK - Refers to collecting sample by method of placing disturbed soil cuttings into a large plastic bag |
| 10 | | | R-2 | | | | | | | | | CAL (CALIFORNIA MODIFIED) - A 3.0" o.d. split tube sampler lined with 2.42" i.d. metal sample rings generally driven into the soil by a 140 lbs. hammer free falling 30 inch |
| 15 | | | S-3 | | | | | | | | | SPT (STANDARD PENETRATION TEST) - A 2.0" o.d. split spoon sampler with a 1.375" i.d. driven into the soil with a 140# hammer free falling a height of 30" |
| 20 | | | | | | | | | | | | |

ABBREVIATIONS FOR OTHER TESTS:

| | |
|---|---|
| AL = Atterberg Limits | GS = Grain Size Analyses |
| CN = Consolidation | PP = Pocket Pen |
| CO = Corrosivity | RV = R-Value |
| CP = Laboratory Compaction | WA = Wash on #200 Sieve |
| DS = Direct Shear | EI = Expansion Index |
| LL = Liquid Limit | TV = Torvane |

GDC_LOG_BORING_1A_LA2 L-675 PRODUCT 425.GPJ GDCLOG.GDT 11/17/11

# LOG OF TEST BORING

| | | | | |
|---|---|---|---|---|
| **PROJECT NAME** Marina Del Rey - Parcel 44 | | **PROJECT NUMBER** LA-1049 | | **BORING** **R-12-15** |
| **SITE LOCATION** Pier 44, Marina Del Rey | **START** 3/2/2012 | **FINISH** 3/2/2012 | | **SHEET NO.** 1 of 3 |
| **DRILLING COMPANY** SoCal Drilling | **DRILLING METHOD** Rotary Wash | **LOGGED BY** NB | | **CHECKED BY** YL |
| **DRILLING EQUIPMENT** Mahew 1000 | **BORING DIA. (in)** 5" | **TOTAL DEPTH (ft)** 50.9 | **GROUND ELEV (ft)** 10 | **DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 13.0 / *-3.0* |
| **SAMPLING METHOD** Hammer: 140 lbs., 30" (Automatic) | **NOTES** | | | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Asphalt = 5"<br>Base = 6" |
| | | | | | | | | | | | | **Sandy Silt (ML) or Silt with Sand (ML)** , stiff, olive brown, moist, low plasticity, fine grained sand, low plasticity. |
| | | | R-1 | 5<br>6<br>8 | 99 | 24.3 | DS | | | 1.0 | | |
| | | | | | | | | | | | | **Grades into Lean Clay with Sand (CL)** , very stiff, dark gray, moist, medium plasticity. |
| 5 | 5 | | | | | | | | | | | Trace roots up to 1/8". |
| | | | R-2 | 5<br>8<br>14 | 101 | 22.2 | DS | | | 4.0 | | |
| 10 | 0 | | | | | | | | | | | **Silty Sand (SM) or Sandy Silt (ML)** , very stiff, gray, moist, fine grained sand, few oxidation, trace black spots, trace angular fine gravel. |
| | | | R-3 | 6<br>8<br>14 | 110 | 19.1 | | | | 3.5 | | |
| 15 | -5 | | | | | | | | | | | **Fat Clay (CH)** , stiff, olive brown, moist, medium to high plasticty, little oxidation, trace fine grained sand. |
| | | | R-4 | 3<br>4<br>7 | 86 | 33.3 | | | | 1.25 | | |
| 20 | -10 | | | | | | | | | | | Medium stiff, dark gray, no oxidation, medium to high plasticity, slight odor, fine grained sand in bottom of chute. |
| | | | R-5 | 3<br>4<br>6 | 87 | 32.6 | CN | | 51<br>26<br>25 | .75 | | |

GDC_LOG_BORING_1A_LA2 LA-1049.GPJ GDCLOG.GDT 4/10/12

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Torrance, CA 90501

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-15** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/2/2012 | 3/2/2012 | 2 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 50.9 | 10 | ▼ 13.0 / *-3.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S-6 | 2<br>4<br>8 | | 32.9 | | | 55<br>24<br>31 | | | **Lean Clay with Sand (CL)** , stiff, gray, moist, medium plasticity, fine grained sand, few organics.<br>**Poorly graded Sand with Silt (SP-SM)** , dense, light brown, wet, fine grained sand. |
| 30 | -20 | | S-7 | 11<br>20<br>22 | | 30.9 | | 10 | | | | |
| 35 | -25 | | S-8 | 16<br>31<br>33 | | 12.0 | | | | | | **Poorly graded Sand (SP)** , very dense, brown, wet, fine to coarse grained sand, few fines, trace fine gravel, decomposed cobble. |
| 40 | -30 | | S-9 | 18<br>35<br>42 | | 18.3 | | | | | | **Poorly graded Sand with Gravel (SP)** , very dense, olive brown, wet, fine to coarse grained sand, subrounded gravels, little fines, ~1/8" layer of oxidation. |
| 45 | -35 | | S-10 | 24<br>50/5" | | 15.6 | | | | | | Increase in medium to coarse grained sand, interbedded with sand with silt. |



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-15** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/2/2012 | 3/2/2012 | 3 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 50.9 | 10 | ⊻ 13.0 / *-3.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | S-11 | 28 50/5" | | 17.6 | | | | | | **Poorly graded Sand (SP) or poorly graded Sand with Silt (SP-SM)** , very dense, brown, wet, fine grained sand, little subrounded fine gravel. |
| | | | | | | | | | | | | Total Boring Depth: 50.9 ft.<br>Possible Fill to: 3.5 ft bgs.<br>Groundwater measured at: 13 ft bgs @ 9:30 am.<br>Groundwater measured at: 13 ft bgs @ 9:50 am. |
| 55 | -45 | | | | | | | | | | | |
| 60 | -50 | | | | | | | | | | | |
| 65 | -55 | | | | | | | | | | | |
| 70 | -60 | | | | | | | | | | | |



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | R-12-16 |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 1 of 2 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 36.5 | 16 | ▼ 16.0 / *0.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | | | | | | | | | | | Asphalt = 3"<br>Base = 6"<br>**Silty Sand (SM)** , olive brown, moist, fine grained sand.<br><br>Gravels from 2 feet to 4 feet. |
| 5 | 10 | | S-1 | 4<br>4<br>3 | | 25.9 | | 42 | | | | **Silty Sand (SM)** , loose, olive brown, moist, fine grained sand. |
| 10 | 5 | | R-2a | 8<br>9<br>11 | | | | | | | | **Poorly graded Sand with Clay and Gravel (SP-SC)** , medium dense, grayish brown, moist, fine to coarse grained sand, fine to coarse gravel, trace organics, silty sand in bottom of chute. |
| | | | R-2b | 11<br>14<br>15 | 125 | 7.5 | | 16 | | | | |
| 15 | 0 | | S-3 | 2<br>1<br>1 | | 25.5 | | | | | ▼ | **Sandy Lean Clay (CL)** , soft, olive brown, wet, low plasticity, fine grained sand. |
| 20 | -5 | | R-4 | 6<br>10<br>11 | 101 | 25.2 | | 36 | | | | **Clayey Sand (SC)** , medium dense, olive brown, wet, fine grained sand. |



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-16** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 2 of 2 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 36.5 | 16 | ▼ 16.0 / *0.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | -10 | X | S-5 | 3<br>4<br>4 | | 23.5 | | | 33<br>16<br>17 | | | **Sandy Lean Clay (CL)** , medium stiff, olive brown, moist, fine grained sand, trace medium grained sand, low plasticity. |
| 30 | -15 | X | S-6 | 5<br>9<br>16 | | 22.7 | | | | | | **Poorly graded Sand with Silt (SP-SM)** , medium dense, olive brown, moist, fine grained sand. |
| 35 | -20 | X | S-7 | 16<br>19<br>24 | | 15.2 | | | | | | **Poorly graded Sand with Gravel (SP)** , dense, olive brown, moist, fine to medium grained sand. |
| 40 | -25 | | | | | | | | | | | |
| 45 | -30 | | | | | | | | | | | |

Total Boring Depth: 36.5 ft.
Possible Fill to: 4 ft bgs.
Groundwater measured at: 16 ft bgs @ 2:45 pm.
Groundwater measured at: 14 ft bgs @ 3:30 pm.



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | R-12-17 |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 1 of 2 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 36.5 | 18 | ▼ 18.0 / *0.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Asphalt = 3"<br>Base = 6" |
| | | | | | | | | | | | | **Poorly graded Sand with Gravel (SP)** , medium dense, olive brown, moist, few clay and silt seams. |
| | 15 | | | | | | | | | | | |
| 5 | | | R-1 | 8<br>8<br>11 | 102 | 19.9 | | | | | | |
| | | | | | | | | | | | | **Lean Clay (CL)** , stiff, dark gray, wet, few fine grained sand, medium plasticity. |
| | 10 | | | | | | | | | | | |
| 10 | | | S-2 | 2<br>5<br>7 | | 41.7 | | | | | | |
| | 5 | | | | | | | | | | | |
| 15 | | | R-3 | 11<br>10<br>9 | 107 | 20.0 | | | | | | **Clayey Sand (SC)** , medium dense, olive brown, wet, fine grained sand, trace oxidation. |
| | 0 | | | | | | | | | | ▼ | |
| 20 | | | R-4 | 4<br>8<br>12 | 105 | 19.7 | | | | 1.0 | | **Interbedded Lean Clay with Sand (CL) and Clayey Sand (SC)** , stiff, olive brown, moist, fine grained sand, medium plasticity, trace oxidation. |
| | -5 | | | | | | | | | | | |

# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-17** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 2 of 2 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 36.5 | 18 | ▼ 18.0 / *0.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S-5 | 2<br>3<br>5 | | 24.1 | | | | 1.75 | | **Lean Clay with Sand (CL)** , stiff, olive brown, wet, fine grained sand to medium grained sand, medium plasticity, few oxidation. |
| | -10 | | | | | | | | | | | |
| 30 | | | R-6 | 8<br>20<br>31 | 113 | 16.8 | | | | 2.0 | | **Poorly graded Sand (SP)** , dense, olive brown, wet, fine to medium grained sand. |
| | -15 | | | | | | | | | | | |
| 35 | | | S-7 | 19<br>27<br>31 | | 16.1 | | | | | | Trace fine gravel. |
| | -20 | | | | | | | | | | | Total Boring Depth: 36.5 ft.<br>Possible Fill to: 6.5 ft bgs.<br>Groundwater measured at: 18 ft bgs @ 12:15 pm.<br>Groundwater measured at: 16 ft bgs @ 3:40 pm. |
| 40 | | | | | | | | | | | | |
| | -25 | | | | | | | | | | | |
| 45 | | | | | | | | | | | | |
| | -30 | | | | | | | | | | | |



GROUP DELTA CONSULTANTS, INC.
370 Amapola Avenue, Suite 212
Torrance, CA 90501

# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-18** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 1 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 51 | 14 | ▼ 12.0 / *2.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | B-1 | | | | CO | | | |
| 5 | | S-2 | 4 / 2 / 2 | | 29.6 | | 47 | | |
| | 5 | S-3 | PUSH / 2 / 3 | | 42.9 | | | 53 / 29 / 24 | |
| 10 | | S-4 | 2 / 5 / 5 | | 28.6 | | | | |
| | 0 | S-5 | 2 / 4 / 4 | | 25.9 | | | 46 / 18 / 28 | |
| 15 | | S-6 | 1 / 2 / 2 | | 36.6 | | | | |
| | -5 | S-7 | 1 / 3 / 5 | | 25.9 | | 51 | | |
| 20 | | S-8 | 2 / 3 / 3 | | 33.8 | | | | |
| | -10 | S-9 | 4 / 5 / 5 | | 29.7 | | | 43 / 21 / 22 | |

DESCRIPTION AND CLASSIFICATION

Asphalt = 3"
Base = 6"

**Silty Sand (SM)** , very loose, greenish brown, moist, fine grained sand, trace gravels.

Little gravels.

**Fat Clay (CH) or Elastic Silt (MH)** , medium stiff, greenish brown, moist, fine grained sand, medium to high plasticity.

Gray, trace fine roots.

**Lean Clay with Sand(CL)** , medium stiff, gray moist, mottled, medium plasticity.

Soft, olive brown, trace roots, increase in plasticity.

**Interbedded Silty Clay (CL) and Silty Sand (SM)** , medium stiff, olive brown, moist, trace roots, trace oxidation, low to medium plastcity.

**Lean Clay (CL)** , medium stiff, olive brown, moist, medium plasticity, sand in bottom of chute.

Trace organic blebs, trace sand and gravel.



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | R-12-18 |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 2 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 51 | 14 | ▼ 12.0 / *2.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S-10 | 4<br>4<br>5 | | 28.8 | | | | 1.75 | | **Silty Clay (CL)** , stiff, dark brown interbedded with reddish brown, wet, few oxidation, trace sand. |
| | -15 | | S-11 | 3<br>5<br>10 | | 21.5 | | | 31<br>22<br>9 | | | **Sandy Clay (CL) or Clayey Sand (SC)** , stiff, light reddish brow, wet, fine to coarse grained sand, trace oxidation, trace fine gravel. |
| 30 | | | S-12 | 12<br>14<br>17 | | 26.6 | | 11 | | | | **Poorly graded Sand with Silt (SP-SM)** , dense, light brown, wet, fine grained sand. |
| | -20 | | S-13 | 15<br>19<br>22 | | 13.9 | | | | | | **Poorly graded Sand with Gravel (SP)** , dense, light brown, wet, fine to coarse grained sand, gravels up to 2". |
| 35 | | | S-14 | 16<br>24<br>25 | | 21.0 | | | | | | Decrease in gravel. |
| | -25 | | S-15 | 25<br>29<br>23 | | 13.8 | | | | | | **Poorly graded Gravel with Sand (GP)** , very dense, olive brown, wet, medium to coase grained sand, angular gravel up to 3". |
| 40 | | | S-16 | 22<br>23<br>20 | | 11.0 | | | | | | **Poorly graded Sand (SP)** , very dense, olive brown, wet, medium grained sand, trace gravel, trace fines. |
| | -30 | | S-17 | 16<br>27<br>34 | | 19.6 | | | | | | |
| 45 | | | S-18 | 19<br>28<br>30 | | 22.2 | | | | | | Interbedded fine grained sand. |
| | -35 | | S-19 | 22<br>33<br>45 | | 19.1 | | | | | | Black, strong odor, possilble hydrocarbon or petroleum. |

# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-18** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/1/2012 | 3/1/2012 | 3 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 51 | 14 | ▼ 12.0 / *2.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | S-20 | 28<br>54/6" | | 22.1 | | | | | | |
| | | | | | | | | | | | | Total Boring Depth: 51 ft.<br>Possible Fill to: 3.5 ft bgs.<br>Groundwater measured at: 14 ft bgs @ 10:30 am.<br>Groundwater measured at: 12 ft bgs @ 3:50 pm. |
| | -40 | | | | | | | | | | | |
| 55 | | | | | | | | | | | | |
| | -45 | | | | | | | | | | | |
| 60 | | | | | | | | | | | | |
| | -50 | | | | | | | | | | | |
| 65 | | | | | | | | | | | | |
| | -55 | | | | | | | | | | | |
| 70 | | | | | | | | | | | | |
| | -60 | | | | | | | | | | | |



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# LOG OF TEST BORING

| | |
|---|---|
| PROJECT NAME | Marina Del Rey - Parcel 44 |
| PROJECT NUMBER | LA-1049 |
| BORING | **R-12-19** |
| SITE LOCATION | Pier 44, Marina Del Rey |
| START | 3/2/2012 |
| FINISH | 3/2/2012 |
| SHEET NO. | 1 of 2 |
| DRILLING COMPANY | SoCal Drilling |
| DRILLING METHOD | Rotary Wash |
| LOGGED BY | NB |
| CHECKED BY | YL |
| DRILLING EQUIPMENT | Mahew 1000 |
| BORING DIA. (in) | 5" |
| TOTAL DEPTH (ft) | 36.5 |
| GROUND ELEV (ft) | 19 |
| DEPTH/*ELEV.* GROUND WATER (ft) | ▼ 15.0 / *4.0* |
| SAMPLING METHOD | Hammer: 140 lbs., 30" (Automatic) |
| NOTES | |

| SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) |
|---|---|---|---|---|---|---|---|
| R-1 | 7<br>10<br>21 | 118 | 11.8 | | | | |
| R-2 | 12<br>19<br>21 | | 3.4 | | | | |
| R-3 | 2<br>2<br>3 | 85 | 36.0 | DS | | | 0 |
| R-4a | 6<br>7<br>9 | | | | | | |
| R-4b | 4<br>7<br>9 | 95 | 27.6 | | | | 1.0 |
| R-5 | 2<br>4<br>8 | 104 | 18.7 | | | | 0.75 |

DEPTH (feet): 5, 10, 15, 20

ELEVATION (feet): 15, 10, 5, 0, -5

DESCRIPTION AND CLASSIFICATION

Asphalt = 3"
Base = 6"

**Clayey Sand (SC)** , dense, light brown, moist, fine grained sand, trace medium to coarse grained sand, trace shell fragments, trace fine gravel.

**Poorly graded Sand (SP)** , dense, yellowish brown, moist, fine to coarse grained sand, trace gravel.

**Silt (ML)** , medium stiff, grayish brown, wet, low plasticity.

**Silty Clay (CL)** , stiff, olive brown, wet, trace fine grained sand, trace gravel up to 2.5", medium plasticity.

**Lean Clay (CL) or Fat Clay (CH)** , stiff, olive brown, wet, medium to high plasticity, little coarse grained sand and fine gravel in bottom of chute.



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-19** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/2/2012 | 3/2/2012 | 2 of 2 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 36.5 | 19 | ▼ 15.0 / *4.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R-6 | 3 5 7 | 89 | 33.2 | | | | 1.0 | | Increase in plasticity. |
| | -10 | | | | | | | | | | | |
| 30 | | | S-7 | 2 2 7 | | 31.7 | | | | | | Moist, little oxidation, trace fine grained sand, medium plasticity. |
| | | | | | | | | | | | | **Poorly graded Sand (SP)** , very dense, light brown, wet, fine to medium grained sand. |
| | -15 | | | | | | | | | | | |
| 35 | | | S-8 | 17 23 29 | | 24.4 | | | | | | |
| | | | | | | | | | | | | Total Boring Depth: 36.5 ft.<br>Possible Fill to: 4.5 ft bgs.<br>Groundwater measured at: 15 ft bgs @ 2:20 pm.<br>Groundwater measured at: 15 ft bgs @ 2:40 pm. |
| | -20 | | | | | | | | | | | |
| 40 | | | | | | | | | | | | |
| | -25 | | | | | | | | | | | |
| 45 | | | | | | | | | | | | |
| | -30 | | | | | | | | | | | |



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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | R-12-20 |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/2/2012 | 3/2/2012 | 1 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 51.5 | 11 | ▼ 14.0 / *-3.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Asphalt = 4"<br>No Base |
| | 10 | | B-1 | | | | EI | | 39<br>20<br>19 | | | **Lean Clay (CL)** , olive brown, moist, medium plasticity.<br>Gravels from 2 feet to 4 feet. |
| 5 | 5 | | R-2 | 1<br>1<br>4 | 97 | 26.1 | CN | | | | | **Silt (ML)** , medium stiff, dark gray, wet, medium plasticity, trace fgs in bottom of chute. |
| 10 | 0 | | R-3 | 2<br>3<br>4 | | 46.7 | | | | | | **Fat Clay (CH)** , medium stiff, dark gray, wet, trace fine grained sand, high plasticity. |
| 15 | -5 | | R-4 | 4<br>5<br>7 | | | | | | | | |
| | | | R-5 | 5<br>5<br>6 | 96 | 26.2 | CN | | | | | |
| 20 | -10 | | R-6 | 5<br>7<br>11 | 92 | 31.4 | | | | | | Increase in fine grained sand. |


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# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | R-12-20 |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/2/2012 | 3/2/2012 | 2 of 3 |

| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 51.5 | 11 | ▼ 14.0 / *-3.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Medium plasticity, trace fine grained sand. |
| | -15 | | R-7 | 7<br>9<br>11 | | | CN | | | | | |
| | | | | | | | | | | | | **Poorly graded Sand (SP)** , dense, grayish black, wet, fine to medium grained sand, trace coarse grained sand, strong odor. |
| 30 | -20 | | S-8 | 17<br>22<br>23 | | 15.6 | | | | | | |
| 35 | | | | | | | | | | | | **Poorly graded Sand with Gravel (SP)** , dense, grayish black, wet, medium to coarse grained sand, angular fine to coarse gravel, trace fines and fine grained sand, slight odor. |
| | -25 | | S-9 | 18<br>25<br>23 | | 9.2 | | | | | | |
| 40 | | | | | | | | | | | | **Poorly graded Sand with Silt and Gravel (SP-SM)** , very dense, grayish black, wet, fine to coarse grained sand, subangular coarse gravel up to 1.5", slight odor. |
| | -30 | | S-10 | 27<br>30<br>33 | | 12.6 | | | | | | |
| 45 | | | | | | | | | | | | Decrease in gravels. |
| | -35 | | S-11 | 22<br>27<br>28 | | 10.6 | | | | | | |

GDC_LOG_BORING_1A_LA2 LA-1049.GPJ GDCLOG.GDT 4/10/12

# LOG OF TEST BORING

| PROJECT NAME | PROJECT NUMBER | BORING |
|---|---|---|
| Marina Del Rey - Parcel 44 | LA-1049 | **R-12-20** |

| SITE LOCATION | START | FINISH | SHEET NO. |
|---|---|---|---|
| Pier 44, Marina Del Rey | 3/2/2012 | 3/2/2012 | 3 of 3 |

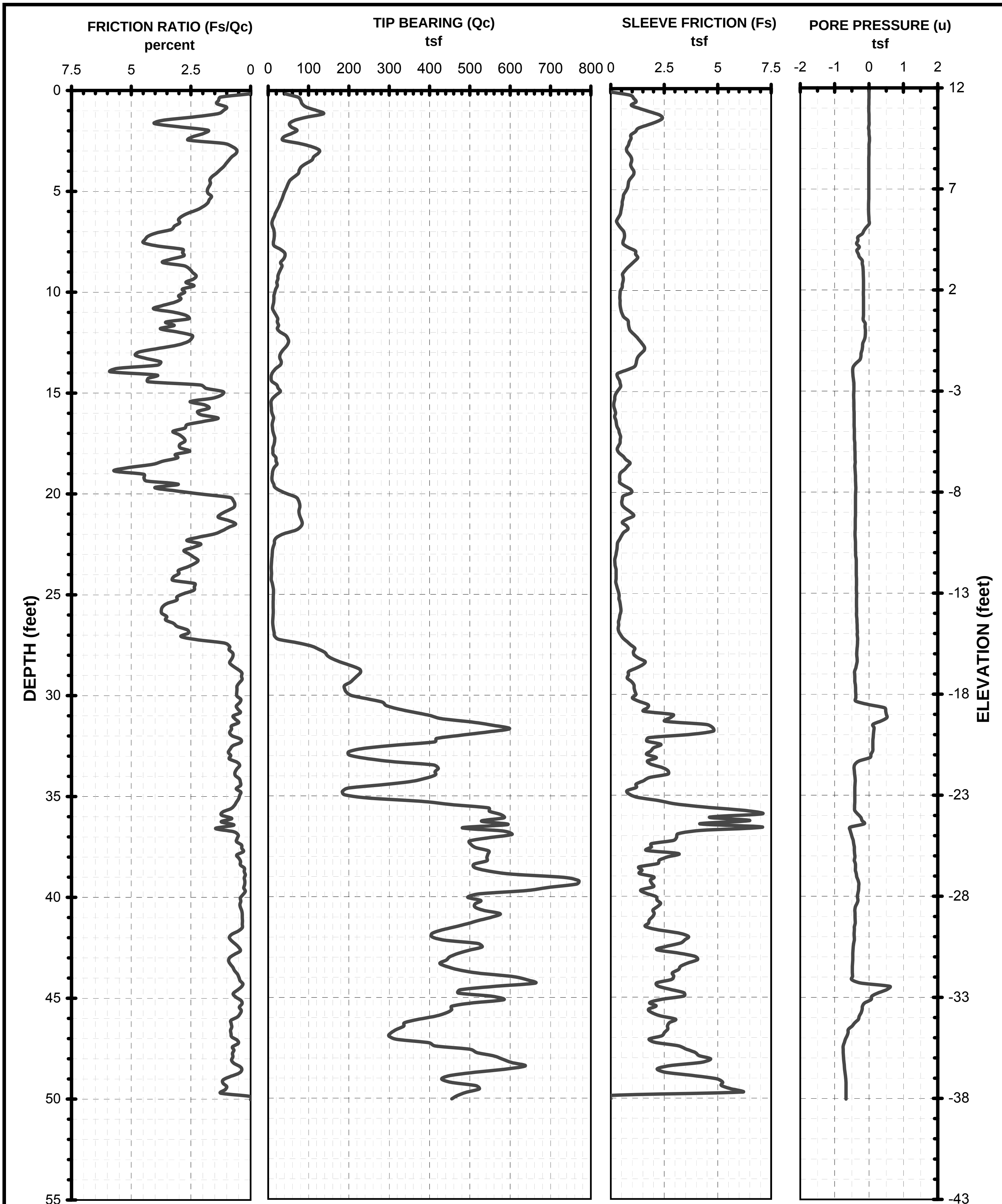
| DRILLING COMPANY | DRILLING METHOD | LOGGED BY | CHECKED BY |
|---|---|---|---|
| SoCal Drilling | Rotary Wash | NB | YL |

| DRILLING EQUIPMENT | BORING DIA. (in) | TOTAL DEPTH (ft) | GROUND ELEV (ft) | DEPTH/*ELEV.* GROUND WATER (ft) |
|---|---|---|---|---|
| Mahew 1000 | 5" | 51.5 | 11 | ⊻ 14.0 / *-3.0* |

| SAMPLING METHOD | NOTES |
|---|---|
| Hammer: 140 lbs., 30" (Automatic) | |

| DEPTH (feet) | ELEVATION (feet) | SAMPLE TYPE | SAMPLE NO. | PENETRATION RESISTANCE (BLOWS / 6 IN) | DRY DENSITY (pcf) | MOISTURE (%) | OTHER TESTS | % PASSING #200 | ATTERBERG LIMITS LL:PL:PI | POCKET PEN (tsf) | GRAPHIC LOG | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | -40 | X | S-12 | 27<br>29<br>33 | | 13.6 | | | | | | **Poorly graded Sand(SP)** , very dense, grayish black, wet, fine to medium grained sand, strong odor. |
| | | | | | | | | | | | | Total Boring Depth: 51.5 ft.<br>Possible Fill to: 4 ft bgs.<br>Groundwater measured at: 14 ft bgs @ 12:00 pm.<br>Groundwater measured at: 14 ft bgs @ 12:25 pm. |
| 55 | -45 | | | | | | | | | | | |
| 60 | -50 | | | | | | | | | | | |
| 65 | -55 | | | | | | | | | | | |
| 70 | -60 | | | | | | | | | | | |

GDC_LOG_BORING_1A_LA2 LA-1049.GPJ GDCLOG.GDT 4/10/12

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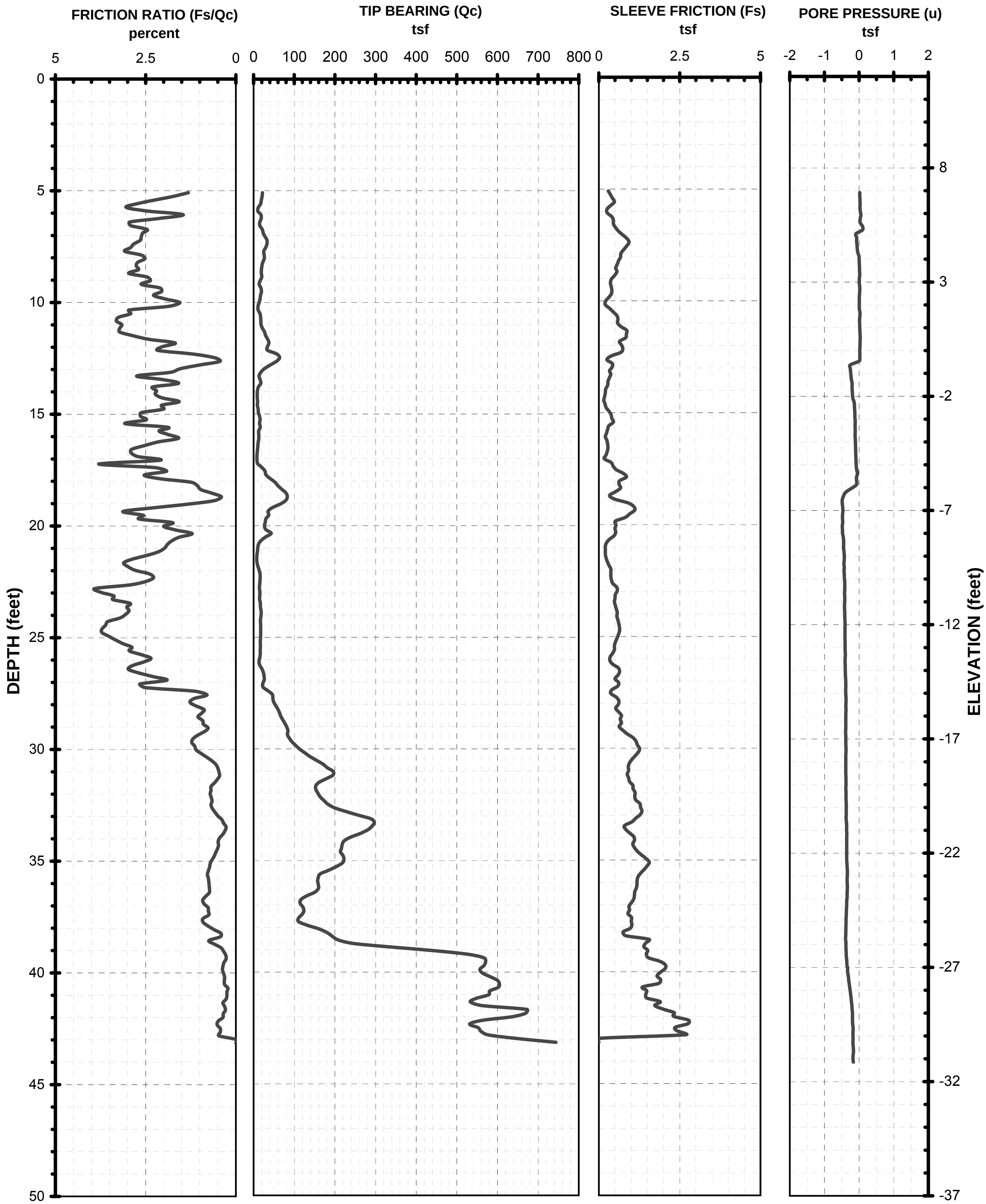
| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-01 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 1-Mar-12 | A-8A |

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C1.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           5.790
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-----------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C1.csv  |------------------------------------------------------------------------------------
```

| " Depth " (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 82.700 | 0.917 | 1.108 | 13.630 | 8 | 1.615 | 20 | 30 | 135 | 50 | 9E9 | 9E9 |
| 1.500 | 80.200 | 1.945 | 2.425 | 30.063 | 6 | 2.002 | 31 | 47 | 110 | 50 | 9E9 | 9E9 |
| 2.500 | 74.317 | 0.913 | 1.229 | 15.112 | 8 | 1.650 | 18 | 27 | 96 | 47 | 9E9 | 9E9 |
| 3.500 | 99.983 | 0.917 | 0.917 | 8.410 | 8 | 1.492 | 24 | 36 | 100 | 47 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 55.883 | 0.918 | 1.643 | 26.404 | 7 | 1.916 | 18 | 27 | 72 | 45 | 9E9 | 9E9 |
| 5.500 | 31.417 | 0.575 | 1.830 | 34.987 | 6 | 2.118 | 12 | 18 | 45 | 41 | 9E9 | 9E9 |
| 6.500 | 13.117 | 0.388 | 2.961 | 55.336 | 4 | 2.598 | 8 | 12 | 9E9 | 9E9 | 1695.641 | 14.343 |
| 7.500 | 16.983 | 0.645 | 3.798 | 58.871 | 4 | 2.681 | 11 | 17 | 9E9 | 9E9 | 2209.996 | 16.789 |
| 8.500 | 35.950 | 1.075 | 2.990 | 47.911 | 5 | 2.423 | 17 | 26 | 9E9 | 9E9 | 4733.594 | 37.241 |
| 9.500 | 23.000 | 0.573 | 2.493 | 49.836 | 5 | 2.468 | 11 | 17 | 9E9 | 9E9 | 2991.470 | 18.226 |
| 10.500 | 13.729 | 0.443 | 3.226 | 61.883 | 4 | 2.752 | 9 | 13 | 9E9 | 9E9 | 1750.279 | 8.237 |
| 11.500 | 23.917 | 0.752 | 3.143 | 56.081 | 5 | 2.615 | 11 | 14 | 9E9 | 9E9 | 3099.604 | 15.030 |
| 12.500 | 43.817 | 1.365 | 3.115 | 50.569 | 5 | 2.485 | 21 | 26 | 9E9 | 9E9 | 5743.065 | 29.233 |
| 13.500 | 25.417 | 1.147 | 4.511 | 64.332 | 3 | 2.810 | 24 | 28 | 9E9 | 9E9 | 3282.977 | 13.182 |
| 14.500 | 16.767 | 0.380 | 2.266 | 56.698 | 5 | 2.630 | 8 | 9 | 9E9 | 9E9 | 2123.395 | 6.998 |
| 15.500 | 10.500 | 0.182 | 1.730 | 59.278 | 5 | 2.691 | 5 | 5 | 9E9 | 9E9 | 1286.286 | 3.448 |
| 16.500 | 11.133 | 0.258 | 2.320 | 64.327 | 5 | 2.810 | 5 | 5 | 9E9 | 9E9 | 1358.303 | 3.421 |
| 17.500 | 13.900 | 0.397 | 2.854 | 65.768 | 5 | 2.844 | 7 | 7 | 9E9 | 9E9 | 1723.729 | 4.288 |
| 18.500 | 16.467 | 0.667 | 4.049 | 70.756 | 4 | 2.961 | 11 | 10 | 9E9 | 9E9 | 2053.591 | 4.987 |
| 19.500 | 14.733 | 0.547 | 3.710 | 71.083 | 4 | 2.969 | 9 | 8 | 9E9 | 9E9 | 1814.416 | 4.072 |
| 20.500 | 71.614 | 0.693 | 0.967 | 27.015 | 8 | 1.930 | 17 | 15 | 50 | 39 | 9E9 | 9E9 |
| 21.500 | 72.317 | 0.748 | 1.035 | 28.461 | 8 | 1.964 | 17 | 14 | 50 | 39 | 9E9 | 9E9 |
| 22.500 | 14.517 | 0.348 | 2.400 | 64.608 | 5 | 2.816 | 7 | 6 | 9E9 | 9E9 | 1765.282 | 3.585 |
| 23.500 | 8.300 | 0.217 | 2.610 | 74.869 | 4 | 3.058 | 5 | 4 | 9E9 | 9E9 | 925.951 | 1.556 |
| 24.500 | 10.467 | 0.278 | 2.659 | 71.974 | 4 | 2.990 | 7 | 6 | 9E9 | 9E9 | 1204.688 | 2.104 |
| 25.500 | 12.417 | 0.430 | 3.463 | 74.438 | 4 | 3.048 | 8 | 6 | 9E9 | 9E9 | 1458.974 | 2.602 |
| 26.500 | 12.367 | 0.378 | 3.059 | 72.667 | 4 | 3.006 | 8 | 6 | 9E9 | 9E9 | 1442.079 | 2.498 |
| 27.500 | 80.900 | 0.823 | 1.018 | 28.447 | 8 | 1.964 | 19 | 15 | 51 | 39 | 9E9 | 9E9 |
| 28.500 | 192.050 | 1.250 | 0.651 | 10.341 | 9 | 1.537 | 37 | 28 | 84 | 43 | 9E9 | 9E9 |
| 29.500 | 201.483 | 0.977 | 0.485 | 4.372 | 9 | 1.396 | 39 | 29 | 86 | 43 | 9E9 | 9E9 |
| 30.500 | 284.850 | 1.412 | 0.496 | 1.281 | 10 | 1.323 | 45 | 33 | 99 | 43 | 9E9 | 9E9 |
| 31.500 | 502.143 | 3.709 | 0.739 | 5.285 | 10 | 1.418 | 80 | 57 | 120 | 47 | 9E9 | 9E9 |
| 32.500 | 297.433 | 1.890 | 0.635 | 6.362 | 10 | 1.443 | 47 | 33 | 99 | 43 | 9E9 | 9E9 |
| 33.500 | 368.450 | 2.247 | 0.610 | 3.744 | 10 | 1.382 | 59 | 41 | 107 | 45 | 9E9 | 9E9 |
| 34.500 | 265.900 | 1.223 | 0.460 | 1.463 | 10 | 1.328 | 42 | 29 | 94 | 43 | 9E9 | 9E9 |
| 35.500 | 459.550 | 4.075 | 0.887 | 10.519 | 10 | 1.541 | 73 | 49 | 115 | 45 | 9E9 | 9E9 |
| 36.500 | 562.733 | 4.945 | 0.879 | 9.146 | 10 | 1.509 | 90 | 59 | 9E9 | 9E9 | 9E9 | 9E9 |
| 37.500 | 525.833 | 2.440 | 0.464 | 0.000 | 10 | 1.189 | 84 | 55 | 9E9 | 9E9 | 9E9 | 9E9 |
| 38.500 | 541.900 | 1.870 | 0.345 | 0.000 | 10 | 1.039 | 87 | 56 | 9E9 | 9E9 | 9E9 | 9E9 |
| 39.500 | 688.017 | 1.807 | 0.263 | 0.000 | 10 | 0.858 | 110 | 69 | 9E9 | 9E9 | 9E9 | 9E9 |
| 40.500 | 526.250 | 2.132 | 0.405 | 0.000 | 10 | 1.133 | 84 | 52 | 9E9 | 9E9 | 9E9 | 9E9 |
| 41.499 | 467.600 | 2.310 | 0.494 | 0.000 | 10 | 1.260 | 75 | 46 | 113 | 45 | 9E9 | 9E9 |
| 42.499 | 484.783 | 3.088 | 0.637 | 3.841 | 10 | 1.384 | 77 | 47 | 114 | 45 | 9E9 | 9E9 |
| 43.499 | 485.450 | 3.322 | 0.684 | 5.518 | 10 | 1.423 | 77 | 46 | 114 | 45 | 9E9 | 9E9 |
| 44.499 | 561.233 | 2.803 | 0.499 | 0.000 | 10 | 1.239 | 90 | 53 | 9E9 | 9E9 | 9E9 | 9E9 |
| 45.499 | 475.500 | 2.050 | 0.431 | 0.000 | 10 | 1.205 | 76 | 44 | 112 | 45 | 9E9 | 9E9 |
| 46.499 | 327.367 | 2.663 | 0.814 | 13.041 | 9 | 1.601 | 63 | 36 | 98 | 43 | 9E9 | 9E9 |
| 47.499 | 450.900 | 3.098 | 0.687 | 6.759 | 10 | 1.453 | 72 | 41 | 110 | 45 | 9E9 | 9E9 |
| 48.499 | 561.483 | 3.377 | 0.601 | 2.216 | 10 | 1.345 | 90 | 51 | 9E9 | 9E9 | 9E9 | 9E9 |
| 49.499 | 480.367 | 4.520 | 0.941 | 13.299 | 9 | 1.607 | 92 | 51 | 111 | 45 | 9E9 | 9E9 |
| 50.499 | 455.100 | 0.000 | 0.000 | 9E9 | 10 | 9E9 | 9E9 | 9E9 | 109 | 45 | 9E9 | 9E9 |





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**CONE PENETRATION TEST RECORD**

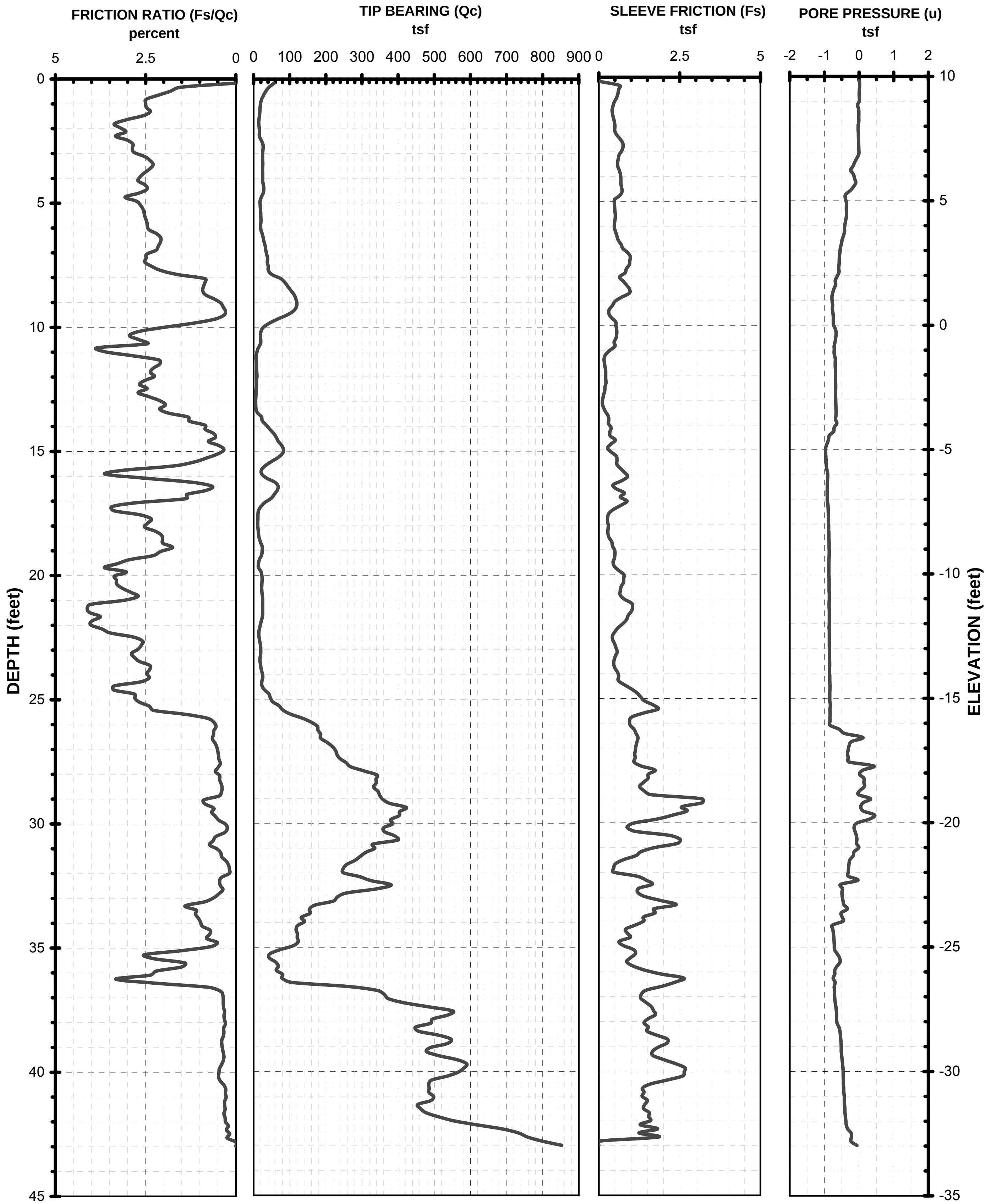
**PROJECT:** Marina Del Rey
**CPT:** Kehoe Testing and Engineering
**DATE:** 2-Mar-12

**HOLE ID**
CPT-12-02
**FIGURE NO.**
A-9A

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C2.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           3.350
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-----------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C2.csv  |------------------------------------------------------------------------------------
```

| " Depth " (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 52.533 | 0.428 | 0.815 | 4.793 | 7 | 1.406 | 17 | 26 | 118 | 50 | 9E9 | 9E9 |
| 1.500 | 35.400 | 0.468 | 1.323 | 17.603 | 7 | 1.708 | 11 | 17 | 79 | 47 | 9E9 | 9E9 |
| 2.500 | 52.350 | 0.407 | 0.777 | 6.018 | 8 | 1.435 | 13 | 20 | 83 | 47 | 9E9 | 9E9 |
| 3.500 | 33.317 | 0.372 | 1.116 | 19.808 | 7 | 1.760 | 11 | 17 | 58 | 43 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 19.083 | 0.257 | 1.345 | 31.473 | 6 | 2.035 | 7 | 11 | 31 | 39 | 9E9 | 9E9 |
| 5.500 | 16.850 | 0.360 | 2.136 | 44.102 | 5 | 2.333 | 8 | 12 | 9E9 | 9E9 | 2202.894 | 25.264 |
| 6.500 | 18.733 | 0.448 | 2.393 | 47.005 | 5 | 2.401 | 9 | 14 | 9E9 | 9E9 | 2446.066 | 23.404 |
| 7.500 | 29.083 | 0.808 | 2.779 | 47.066 | 6 | 2.403 | 11 | 17 | 36 | 39 | 9E9 | 9E9 |
| 8.500 | 21.267 | 0.570 | 2.680 | 50.818 | 5 | 2.491 | 10 | 15 | 9E9 | 9E9 | 2767.421 | 19.386 |
| 9.500 | 16.717 | 0.372 | 2.223 | 51.210 | 5 | 2.501 | 8 | 12 | 9E9 | 9E9 | 2152.425 | 12.308 |
| 10.500 | 14.971 | 0.417 | 2.786 | 58.004 | 5 | 2.661 | 7 | 10 | 9E9 | 9E9 | 1911.662 | 9.379 |
| 11.500 | 30.783 | 0.762 | 2.474 | 48.275 | 6 | 2.431 | 12 | 16 | 30 | 37 | 9E9 | 9E9 |
| 12.500 | 46.733 | 0.478 | 1.024 | 26.909 | 7 | 1.928 | 15 | 19 | 45 | 39 | 9E9 | 9E9 |
| 13.500 | 14.467 | 0.297 | 2.051 | 54.613 | 5 | 2.581 | 7 | 9 | 9E9 | 9E9 | 1822.218 | 7.310 |
| 14.500 | 9.950 | 0.208 | 2.094 | 60.727 | 5 | 2.725 | 5 | 6 | 9E9 | 9E9 | 1211.835 | 4.186 |
| 15.500 | 14.483 | 0.342 | 2.359 | 58.273 | 5 | 2.667 | 7 | 8 | 9E9 | 9E9 | 1806.210 | 6.585 |
| 16.500 | 10.200 | 0.247 | 2.418 | 64.077 | 4 | 2.804 | 7 | 8 | 9E9 | 9E9 | 1233.615 | 3.912 |
| 17.500 | 22.700 | 0.523 | 2.305 | 53.115 | 6 | 2.545 | 9 | 10 | 13 | 33 | 9E9 | 9E9 |
| 18.500 | 70.550 | 0.543 | 0.770 | 19.343 | 8 | 1.749 | 17 | 19 | 56 | 41 | 9E9 | 9E9 |
| 19.500 | 40.700 | 0.895 | 2.199 | 46.142 | 6 | 2.381 | 16 | 17 | 34 | 37 | 9E9 | 9E9 |
| 20.500 | 24.314 | 0.396 | 1.627 | 47.028 | 6 | 2.402 | 9 | 9 | 13 | 33 | 9E9 | 9E9 |
| 21.500 | 9.517 | 0.260 | 2.732 | 69.575 | 4 | 2.933 | 6 | 6 | 9E9 | 9E9 | 1107.787 | 2.763 |
| 22.500 | 15.200 | 0.447 | 2.939 | 64.777 | 5 | 2.820 | 7 | 7 | 9E9 | 9E9 | 1857.758 | 5.086 |
| 23.500 | 16.667 | 0.518 | 3.110 | 65.014 | 5 | 2.826 | 8 | 8 | 9E9 | 9E9 | 2040.915 | 5.523 |
| 24.500 | 17.167 | 0.608 | 3.544 | 67.462 | 4 | 2.884 | 11 | 10 | 9E9 | 9E9 | 2101.818 | 5.537 |
| 25.500 | 16.300 | 0.468 | 2.873 | 64.642 | 5 | 2.817 | 8 | 7 | 9E9 | 9E9 | 1971.559 | 4.945 |
| 26.500 | 20.700 | 0.517 | 2.496 | 59.255 | 5 | 2.690 | 10 | 9 | 9E9 | 9E9 | 2559.266 | 6.633 |
| 27.500 | 37.233 | 0.520 | 1.397 | 41.420 | 7 | 2.270 | 12 | 11 | 26 | 35 | 9E9 | 9E9 |
| 28.500 | 65.617 | 0.632 | 0.963 | 27.874 | 8 | 1.950 | 16 | 14 | 47 | 39 | 9E9 | 9E9 |
| 29.500 | 89.400 | 0.940 | 1.051 | 26.206 | 8 | 1.911 | 21 | 18 | 59 | 39 | 9E9 | 9E9 |
| 30.500 | 147.550 | 1.078 | 0.731 | 13.892 | 9 | 1.621 | 28 | 24 | 77 | 41 | 9E9 | 9E9 |
| 31.500 | 170.686 | 0.986 | 0.578 | 7.985 | 9 | 1.482 | 33 | 27 | 83 | 43 | 9E9 | 9E9 |
| 32.500 | 200.917 | 1.237 | 0.616 | 7.755 | 9 | 1.476 | 38 | 31 | 88 | 43 | 9E9 | 9E9 |
| 33.500 | 276.433 | 0.968 | 0.350 | 0.000 | 10 | 1.141 | 44 | 35 | 100 | 45 | 9E9 | 9E9 |
| 34.500 | 218.783 | 1.203 | 0.550 | 5.139 | 9 | 1.414 | 42 | 33 | 91 | 43 | 9E9 | 9E9 |
| 35.500 | 181.300 | 1.355 | 0.747 | 13.440 | 9 | 1.610 | 35 | 27 | 83 | 43 | 9E9 | 9E9 |
| 36.500 | 138.500 | 1.107 | 0.799 | 17.900 | 9 | 1.715 | 27 | 20 | 72 | 41 | 9E9 | 9E9 |
| 37.500 | 119.467 | 0.968 | 0.811 | 20.111 | 8 | 1.767 | 29 | 22 | 66 | 41 | 9E9 | 9E9 |
| 38.500 | 220.483 | 1.157 | 0.525 | 5.077 | 9 | 1.413 | 42 | 31 | 89 | 43 | 9E9 | 9E9 |
| 39.500 | 540.067 | 1.752 | 0.324 | 0.000 | 10 | 0.978 | 86 | 62 | 9E9 | 9E9 | 9E9 | 9E9 |
| 40.500 | 588.000 | 1.715 | 0.292 | 0.000 | 10 | 0.912 | 94 | 67 | 9E9 | 9E9 | 9E9 | 9E9 |
| 41.499 | 600.371 | 1.883 | 0.314 | 0.000 | 10 | 0.949 | 96 | 67 | 9E9 | 9E9 | 9E9 | 9E9 |
| 42.499 | 572.717 | 2.168 | 0.379 | 0.000 | 10 | 1.057 | 91 | 62 | 9E9 | 9E9 | 9E9 | 9E9 |
| 43.499 | 743.900 | 0.000 | 0.000 | 9E9 | 10 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 |

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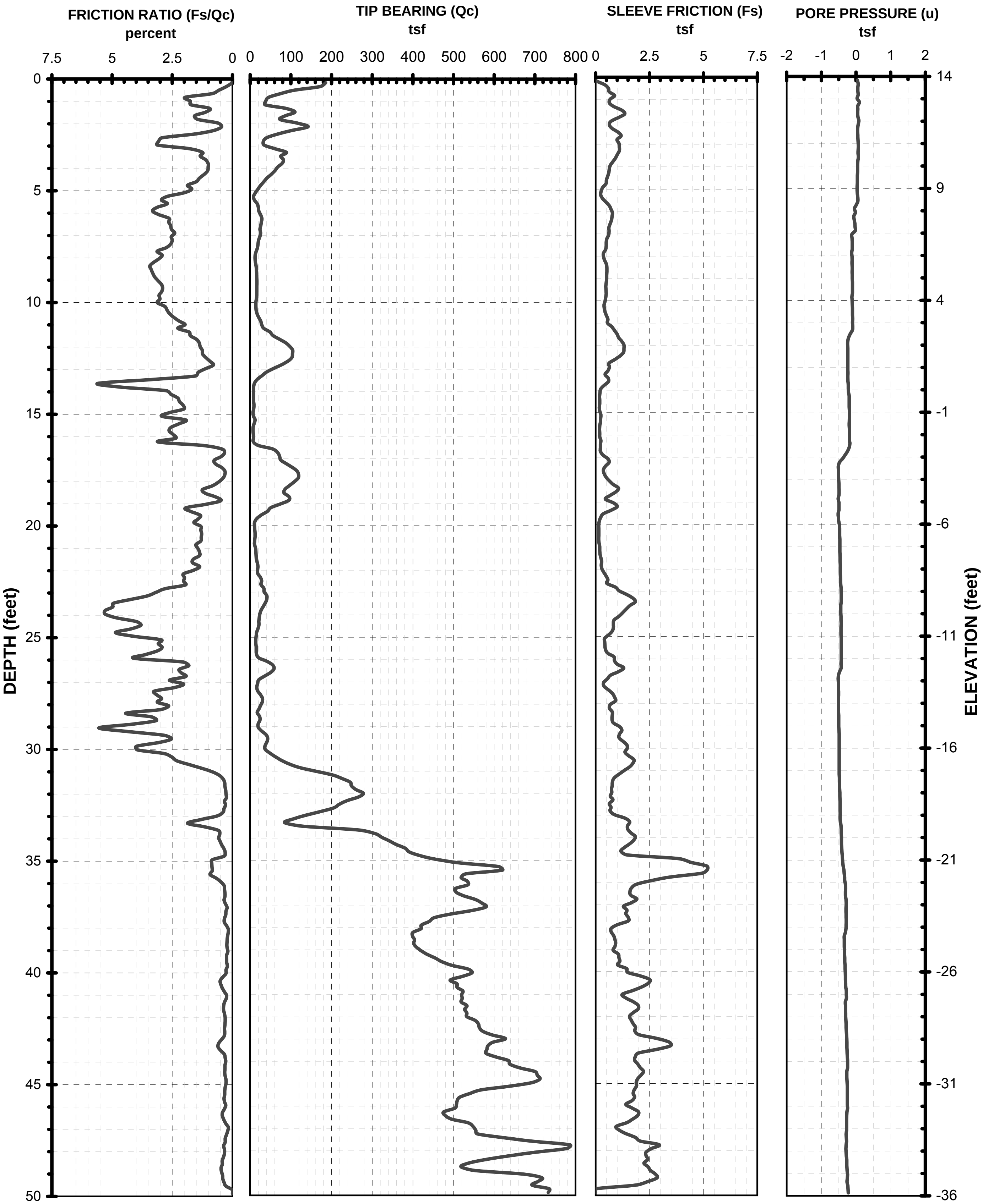
| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-03 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 1-Mar-12 | A-10A |

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C3.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           0.610
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C3.csv  |-------------------------------------------------------------------------------------
" Depth     Qt(avg)   Fs(avg)   Rf        FC        Rf Zone   Ic        Spt N     Spt N1    Dr        Phi       Su        OCR
" (feet)    (TSF)     (TSF)     (%)       (%)       (zone #)  index     (blow/ft) (blow/ft) (%)       (degree)  (psf)     (ratio)
"-------------------------------------------------------------------------------------------------------------------------
    0.500    33.467     0.478     1.429    17.372     7         1.703    11         17        101        50          9E9       9E9
    1.500    16.050     0.450     2.804    39.118     5         2.215     8         12        9E9        9E9     2128.551  123.970
    2.500    21.750     0.643     2.958    41.031     5         2.261    10         15        9E9        9E9     2880.577  108.309
    3.500    25.033     0.618     2.470    37.468     6         2.177    10         15        52         43          9E9       9E9
```

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 24.417 | 0.653 | 2.676 | 40.675 | 5 | 2.252 | 12 | 18 | 9E9 | 9E9 | 3223.992 | 77.598 |
| 5.500 | 19.483 | 0.493 | 2.532 | 42.464 | 5 | 2.294 | 9 | 14 | 9E9 | 9E9 | 2562.317 | 48.815 |
| 6.500 | 27.467 | 0.598 | 2.178 | 37.372 | 6 | 2.174 | 11 | 17 | 46 | 41 | 9E9 | 9E9 |
| 7.500 | 40.650 | 0.903 | 2.222 | 35.605 | 6 | 2.133 | 16 | 24 | 59 | 43 | 9E9 | 9E9 |
| 8.500 | 98.267 | 0.807 | 0.821 | 8.026 | 8 | 1.482 | 24 | 36 | 91 | 45 | 9E9 | 9E9 |
| 9.500 | 91.367 | 0.410 | 0.449 | 0.000 | 8 | 1.202 | 22 | 33 | 86 | 45 | 9E9 | 9E9 |
| 10.500 | 18.086 | 0.496 | 2.741 | 49.740 | 5 | 2.466 | 9 | 14 | 9E9 | 9E9 | 2344.719 | 22.937 |
| 11.500 | 8.217 | 0.192 | 2.333 | 56.460 | 4 | 2.624 | 5 | 8 | 9E9 | 9E9 | 1019.230 | 7.394 |
| 12.500 | 7.100 | 0.177 | 2.488 | 60.492 | 4 | 2.719 | 5 | 8 | 9E9 | 9E9 | 862.298 | 5.512 |
| 13.500 | 17.283 | 0.223 | 1.292 | 38.123 | 6 | 2.192 | 7 | 11 | 15 | 37 | 9E9 | 9E9 |
| 14.500 | 64.917 | 0.370 | 0.570 | 7.936 | 8 | 1.480 | 16 | 24 | 65 | 43 | 9E9 | 9E9 |
| 15.500 | 45.300 | 0.587 | 1.295 | 28.576 | 7 | 1.967 | 14 | 21 | 50 | 41 | 9E9 | 9E9 |
| 16.500 | 55.417 | 0.670 | 1.209 | 25.713 | 7 | 1.899 | 18 | 27 | 57 | 41 | 9E9 | 9E9 |
| 17.500 | 16.583 | 0.478 | 2.884 | 56.482 | 5 | 2.625 | 8 | 12 | 9E9 | 9E9 | 2095.607 | 11.679 |
| 18.500 | 16.167 | 0.332 | 2.052 | 50.897 | 5 | 2.493 | 8 | 12 | 9E9 | 9E9 | 2032.033 | 10.584 |
| 19.500 | 18.017 | 0.500 | 2.775 | 55.938 | 5 | 2.612 | 9 | 13 | 9E9 | 9E9 | 2270.760 | 11.485 |
| 20.500 | 23.314 | 0.727 | 3.119 | 55.856 | 5 | 2.610 | 11 | 15 | 9E9 | 9E9 | 2967.216 | 15.156 |
| 21.500 | 23.300 | 0.930 | 3.991 | 61.332 | 4 | 2.739 | 15 | 20 | 9E9 | 9E9 | 2952.208 | 14.230 |
| 22.500 | 16.667 | 0.495 | 2.970 | 59.853 | 5 | 2.704 | 8 | 10 | 9E9 | 9E9 | 2061.585 | 8.622 |
| 23.500 | 19.867 | 0.515 | 2.592 | 55.610 | 5 | 2.604 | 10 | 12 | 9E9 | 9E9 | 2482.582 | 10.367 |
| 24.500 | 31.317 | 0.907 | 2.895 | 53.015 | 5 | 2.543 | 15 | 18 | 9E9 | 9E9 | 3994.805 | 17.904 |
| 25.500 | 99.283 | 1.375 | 1.385 | 26.792 | 8 | 1.925 | 24 | 28 | 71 | 41 | 9E9 | 9E9 |
| 26.500 | 191.167 | 1.125 | 0.588 | 3.251 | 9 | 1.370 | 37 | 42 | 96 | 45 | 9E9 | 9E9 |
| 27.500 | 254.683 | 1.250 | 0.491 | 0.000 | 9 | 1.228 | 49 | 54 | 106 | 45 | 9E9 | 9E9 |
| 28.500 | 340.817 | 1.448 | 0.425 | 0.000 | 10 | 1.107 | 54 | 58 | 116 | 47 | 9E9 | 9E9 |
| 29.500 | 390.800 | 2.630 | 0.673 | 1.840 | 10 | 1.337 | 62 | 64 | 121 | 47 | 9E9 | 9E9 |
| 30.500 | 371.217 | 1.700 | 0.458 | 0.000 | 10 | 1.144 | 59 | 60 | 118 | 47 | 9E9 | 9E9 |
| 31.500 | 282.257 | 0.907 | 0.321 | 0.000 | 10 | 1.028 | 45 | 44 | 107 | 45 | 9E9 | 9E9 |
| 32.500 | 304.517 | 1.358 | 0.446 | 0.000 | 10 | 1.179 | 49 | 47 | 109 | 45 | 9E9 | 9E9 |
| 33.500 | 162.300 | 1.753 | 1.080 | 19.664 | 9 | 1.757 | 31 | 29 | 84 | 43 | 9E9 | 9E9 |
| 34.500 | 118.783 | 0.865 | 0.728 | 15.054 | 9 | 1.648 | 23 | 21 | 71 | 41 | 9E9 | 9E9 |
| 35.500 | 58.617 | 1.078 | 1.840 | 41.311 | 7 | 2.267 | 19 | 17 | 43 | 37 | 9E9 | 9E9 |
| 36.500 | 205.967 | 1.937 | 0.940 | 15.328 | 9 | 1.655 | 39 | 34 | 92 | 43 | 9E9 | 9E9 |
| 37.500 | 476.200 | 1.557 | 0.327 | 0.000 | 10 | 0.961 | 76 | 66 | 123 | 47 | 9E9 | 9E9 |
| 38.500 | 498.683 | 1.738 | 0.349 | 0.000 | 10 | 0.991 | 80 | 68 | 125 | 47 | 9E9 | 9E9 |
| 39.500 | 535.917 | 2.032 | 0.379 | 0.000 | 10 | 1.027 | 86 | 71 | 9E9 | 9E9 | 9E9 | 9E9 |
| 40.500 | 508.517 | 1.953 | 0.384 | 0.000 | 10 | 1.047 | 81 | 66 | 124 | 47 | 9E9 | 9E9 |
| 41.499 | 492.786 | 1.477 | 0.300 | 0.000 | 10 | 0.931 | 79 | 63 | 122 | 47 | 9E9 | 9E9 |
| 42.499 | 741.817 | 1.030 | 0.139 | 0.000 | 10 | 0.472 | 118 | 92 | 9E9 | 9E9 | 9E9 | 9E9 |





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4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126


**CONE PENETRATION TEST RECORD**

**PROJECT:** Marina Del Rey

**CPT:** Kehoe Testing and Engineering

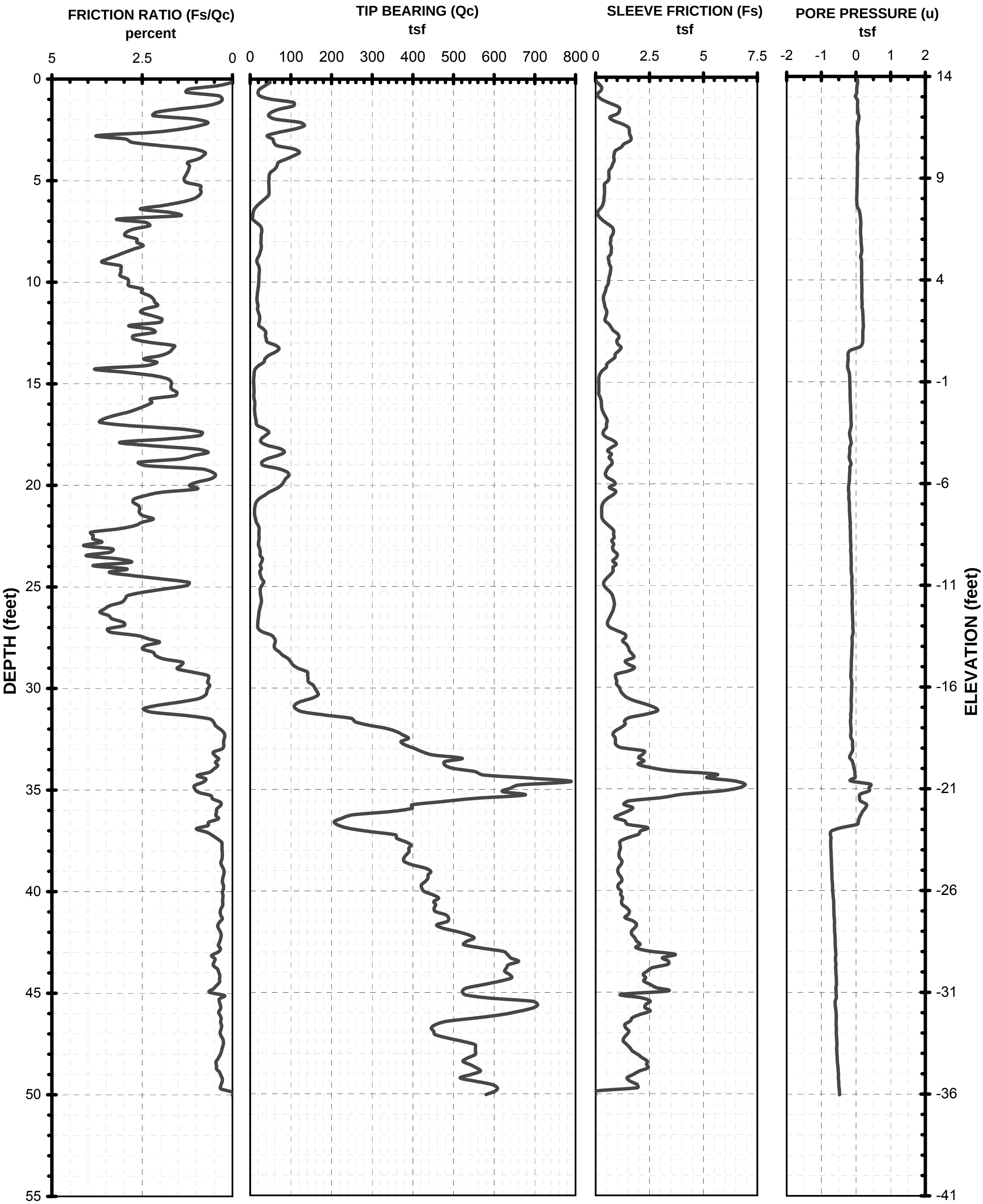
**DATE:** 2-Mar-12

**HOLE ID** CPT-12-04

**FIGURE NO.** A-11A

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C4.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           2.900
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C4.csv  |-------------------------------------------------------------------------------------
" Depth     Qt(avg)   Fs(avg)   Rf        FC        Rf Zone   Ic        Spt N     Spt N1    Dr        Phi       Su        OCR
" (feet)    (TSF)     (TSF)     (%)       (%)       (zone #)  index     (blow/ft) (blow/ft) (%)       (degree)  (psf)     (ratio)
"----------------------------------------------------------------------------------------------------------------------------------
    0.500   103.767     0.530     0.511     0.000     9         1.236    20        30        143       50           9E9       9E9
    1.500    85.250     0.970     1.138    11.912     8         1.574    20        30        112       50           9E9       9E9
    2.500    69.767     0.952     1.364    17.767     7         1.712    22        33        93        47           9E9       9E9
    3.500    75.550     0.935     1.238    16.625     8         1.685    18        27        89        47           9E9       9E9
```

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 38.767 | 0.518 | 1.337 | 24.659 | 7 | 1.875 | 12 | 18 | 58 | 43 | 9E9 | 9E9 |
| 5.500 | 15.067 | 0.435 | 2.887 | 51.470 | 5 | 2.507 | 7 | 11 | 9E9 | 9E9 | 1959.938 | 21.424 |
| 6.500 | 26.217 | 0.695 | 2.651 | 45.846 | 6 | 2.374 | 10 | 15 | 35 | 39 | 9E9 | 9E9 |
| 7.500 | 18.083 | 0.487 | 2.691 | 51.336 | 5 | 2.504 | 9 | 14 | 9E9 | 9E9 | 2354.813 | 18.300 |
| 8.500 | 14.417 | 0.473 | 3.283 | 59.115 | 4 | 2.687 | 9 | 14 | 9E9 | 9E9 | 1857.793 | 11.673 |
| 9.500 | 16.200 | 0.485 | 2.994 | 57.244 | 5 | 2.643 | 8 | 12 | 9E9 | 9E9 | 2085.406 | 11.767 |
| 10.500 | 19.071 | 0.470 | 2.464 | 52.213 | 5 | 2.524 | 9 | 13 | 9E9 | 9E9 | 2461.946 | 13.617 |
| 11.500 | 65.750 | 1.033 | 1.572 | 30.762 | 7 | 2.018 | 21 | 30 | 61 | 41 | 9E9 | 9E9 |
| 12.500 | 89.700 | 0.975 | 1.087 | 20.630 | 8 | 1.780 | 21 | 29 | 72 | 43 | 9E9 | 9E9 |
| 13.500 | 18.750 | 0.467 | 2.489 | 54.230 | 5 | 2.572 | 9 | 12 | 9E9 | 9E9 | 2397.589 | 11.111 |
| 14.500 | 8.217 | 0.187 | 2.272 | 64.069 | 4 | 2.804 | 5 | 6 | 9E9 | 9E9 | 984.774 | 3.474 |
| 15.500 | 8.700 | 0.208 | 2.395 | 64.800 | 4 | 2.821 | 6 | 7 | 9E9 | 9E9 | 1036.786 | 3.529 |
| 16.500 | 38.433 | 0.238 | 0.620 | 21.732 | 7 | 1.806 | 12 | 14 | 35 | 37 | 9E9 | 9E9 |
| 17.500 | 103.133 | 0.480 | 0.465 | 4.463 | 9 | 1.398 | 20 | 23 | 73 | 43 | 9E9 | 9E9 |
| 18.500 | 93.717 | 0.760 | 0.811 | 16.587 | 8 | 1.684 | 22 | 25 | 68 | 41 | 9E9 | 9E9 |
| 19.500 | 36.900 | 0.552 | 1.495 | 39.259 | 7 | 2.219 | 12 | 13 | 31 | 37 | 9E9 | 9E9 |
| 20.500 | 11.443 | 0.154 | 1.348 | 53.646 | 5 | 2.558 | 5 | 5 | 9E9 | 9E9 | 1371.113 | 3.997 |
| 21.500 | 16.250 | 0.243 | 1.497 | 50.802 | 6 | 2.491 | 6 | 6 | -1 | 31 | 9E9 | 9E9 |
| 22.500 | 27.617 | 0.662 | 2.396 | 52.850 | 6 | 2.539 | 11 | 11 | 18 | 35 | 9E9 | 9E9 |
| 23.500 | 33.550 | 1.545 | 4.605 | 63.972 | 4 | 2.801 | 21 | 21 | 9E9 | 9E9 | 4294.667 | 14.790 |
| 24.500 | 19.150 | 0.822 | 4.291 | 69.281 | 3 | 2.927 | 18 | 18 | 9E9 | 9E9 | 2363.605 | 6.744 |
| 25.500 | 15.550 | 0.522 | 3.355 | 67.672 | 4 | 2.889 | 10 | 10 | 9E9 | 9E9 | 1875.309 | 4.871 |
| 26.500 | 43.783 | 0.913 | 2.086 | 46.255 | 6 | 2.384 | 17 | 16 | 33 | 37 | 9E9 | 9E9 |
| 27.500 | 22.850 | 0.655 | 2.867 | 60.470 | 5 | 2.719 | 11 | 10 | 9E9 | 9E9 | 2836.830 | 7.616 |
| 28.500 | 21.817 | 0.740 | 3.392 | 64.610 | 5 | 2.816 | 10 | 9 | 9E9 | 9E9 | 2690.677 | 6.886 |
| 29.500 | 34.533 | 1.203 | 3.485 | 59.982 | 5 | 2.707 | 17 | 15 | 9E9 | 9E9 | 4378.335 | 12.238 |
| 30.500 | 73.550 | 1.572 | 2.137 | 42.323 | 7 | 2.291 | 23 | 20 | 51 | 39 | 9E9 | 9E9 |
| 31.500 | 232.086 | 0.900 | 0.388 | 0.000 | 9 | 1.212 | 44 | 37 | 95 | 43 | 9E9 | 9E9 |
| 32.500 | 206.533 | 0.727 | 0.352 | 0.000 | 9 | 1.208 | 40 | 33 | 90 | 43 | 9E9 | 9E9 |
| 33.500 | 202.217 | 1.567 | 0.775 | 12.311 | 9 | 1.583 | 39 | 32 | 89 | 43 | 9E9 | 9E9 |
| 34.500 | 390.650 | 1.855 | 0.475 | 0.000 | 10 | 1.207 | 62 | 50 | 114 | 45 | 9E9 | 9E9 |
| 35.500 | 554.550 | 4.288 | 0.773 | 5.065 | 10 | 1.413 | 89 | 70 | 9E9 | 9E9 | 9E9 | 9E9 |
| 36.500 | 532.483 | 1.723 | 0.324 | 0.000 | 10 | 0.962 | 85 | 65 | 9E9 | 9E9 | 9E9 | 9E9 |
| 37.500 | 488.417 | 1.363 | 0.279 | 0.000 | 10 | 0.912 | 78 | 59 | 121 | 47 | 9E9 | 9E9 |
| 38.500 | 405.650 | 0.832 | 0.205 | 0.000 | 10 | 0.826 | 65 | 48 | 113 | 45 | 9E9 | 9E9 |
| 39.500 | 468.967 | 1.087 | 0.232 | 0.000 | 10 | 0.846 | 75 | 55 | 118 | 45 | 9E9 | 9E9 |
| 40.500 | 516.567 | 2.058 | 0.398 | 0.000 | 10 | 1.091 | 82 | 59 | 121 | 47 | 9E9 | 9E9 |
| 41.499 | 526.486 | 1.660 | 0.315 | 0.000 | 10 | 0.975 | 84 | 59 | 9E9 | 9E9 | 9E9 | 9E9 |
| 42.499 | 578.733 | 1.982 | 0.342 | 0.000 | 10 | 1.001 | 92 | 64 | 9E9 | 9E9 | 9E9 | 9E9 |
| 43.499 | 596.967 | 2.558 | 0.429 | 0.000 | 10 | 1.114 | 95 | 65 | 9E9 | 9E9 | 9E9 | 9E9 |
| 44.499 | 685.750 | 2.030 | 0.296 | 0.000 | 10 | 0.902 | 109 | 73 | 9E9 | 9E9 | 9E9 | 9E9 |
| 45.499 | 545.867 | 1.718 | 0.315 | 0.000 | 10 | 0.984 | 87 | 58 | 9E9 | 9E9 | 9E9 | 9E9 |
| 46.499 | 506.400 | 1.622 | 0.320 | 0.000 | 10 | 1.014 | 81 | 53 | 118 | 45 | 9E9 | 9E9 |
| 47.499 | 664.883 | 1.997 | 0.300 | 0.000 | 10 | 0.927 | 106 | 68 | 9E9 | 9E9 | 9E9 | 9E9 |
| 48.499 | 587.917 | 2.385 | 0.406 | 0.000 | 10 | 1.107 | 94 | 60 | 9E9 | 9E9 | 9E9 | 9E9 |
| 49.499 | 709.967 | 1.650 | 0.232 | 0.000 | 10 | 0.795 | 113 | 71 | 9E9 | 9E9 | 9E9 | 9E9 |





GROUP DELTA CONSULTANTS
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32 Mauchly, Suite B, Irvine, CA 92618
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126


| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-05 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 1-Mar-12 | A-12A |

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C5.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
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"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                0.830
"Value for Water Table (in m):          3.350
"Valid Zone Classification based on:    Rf
"Missing unit weight to start depth:    18.860
"Method for calculating Su:             Nk
"Value of the constant Nk:              15.000
"Method used to calculate OCR:          Su/EOS
"(Su/EOS) for normal consolidation:     0.250
"Define Zone 6 for Sand Parameters?     YES
"Sand Compressibility for calc Dr:      Moderate
"Method for Friction Angle:             Robertson & Campanella
"Vertical Flow Gradient, i (- up):      +0.000
"CPT to SPT N60 Conversion:             Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
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"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C5.csv  |------------------------------------------------------------------------------------
```
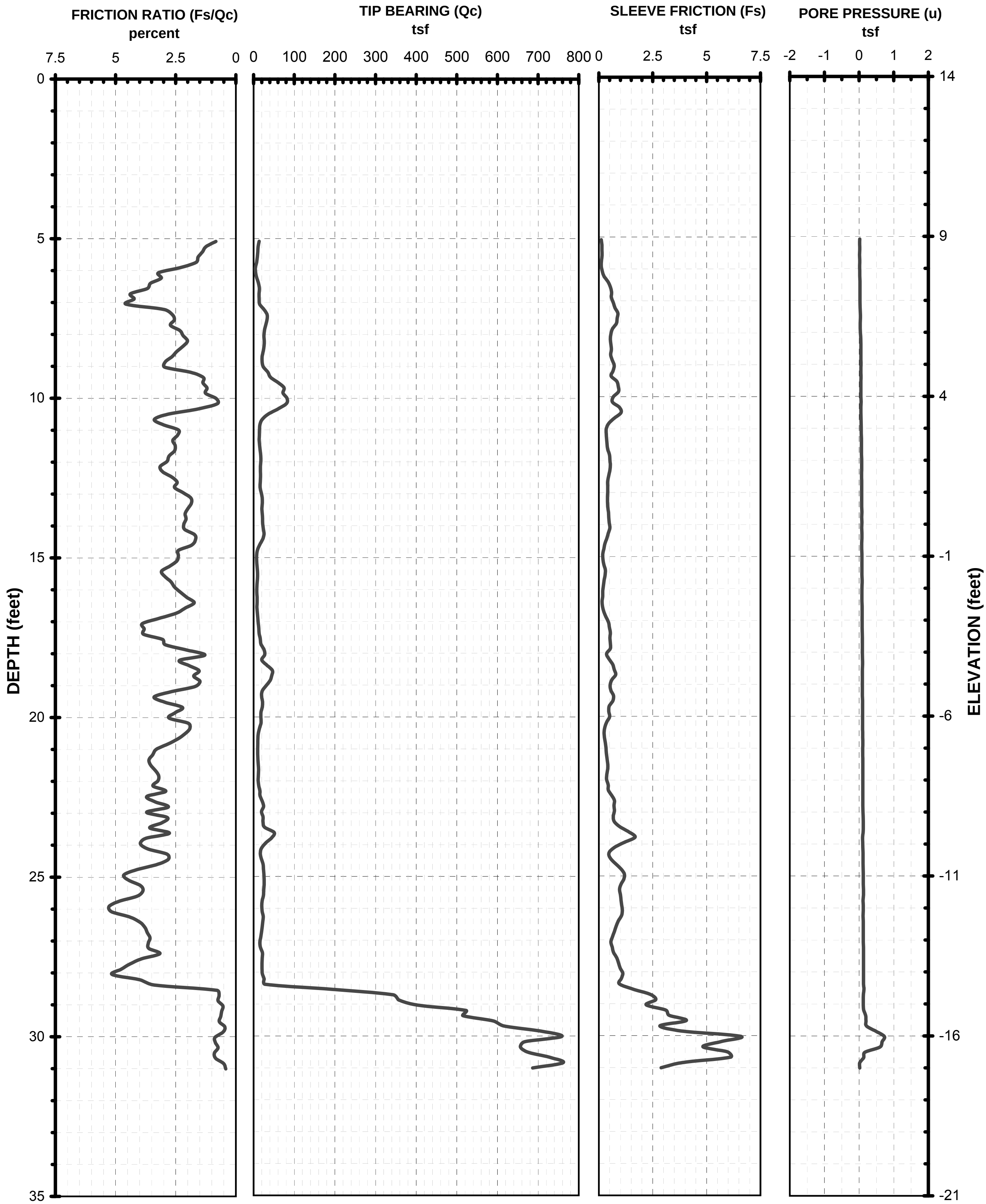

| " Depth " (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 33.583 | 0.150 | 0.447 | 0.000 | 7 | 1.047 | 11 | 17 | 101 | 50 | 9E9 | 9E9 |
| 1.500 | 74.033 | 0.830 | 1.121 | 11.650 | 8 | 1.568 | 18 | 27 | 107 | 50 | 9E9 | 9E9 |
| 2.500 | 88.450 | 1.392 | 1.573 | 20.340 | 7 | 1.773 | 28 | 42 | 103 | 50 | 9E9 | 9E9 |
| 3.500 | 91.717 | 1.122 | 1.223 | 15.400 | 8 | 1.656 | 22 | 33 | 97 | 47 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 56.583 | 0.705 | 1.246 | 20.054 | 7 | 1.766 | 18 | 27 | 73 | 45 | 9E9 | 9E9 |
| 5.500 | 44.133 | 0.435 | 0.986 | 18.785 | 7 | 1.736 | 14 | 21 | 59 | 43 | 9E9 | 9E9 |
| 6.500 | 12.350 | 0.233 | 1.889 | 47.277 | 5 | 2.408 | 6 | 9 | 9E9 | 9E9 | 1592.176 | 13.574 |
| 7.500 | 24.783 | 0.670 | 2.703 | 48.174 | 5 | 2.429 | 12 | 18 | 9E9 | 9E9 | 3242.213 | 27.575 |
| 8.500 | 23.967 | 0.687 | 2.865 | 51.008 | 5 | 2.496 | 11 | 17 | 9E9 | 9E9 | 3122.734 | 22.410 |
| 9.500 | 20.917 | 0.655 | 3.131 | 55.446 | 5 | 2.600 | 10 | 15 | 9E9 | 9E9 | 2707.622 | 16.264 |
| 10.500 | 18.586 | 0.466 | 2.506 | 53.583 | 5 | 2.556 | 9 | 13 | 9E9 | 9E9 | 2389.211 | 12.273 |
| 11.500 | 20.983 | 0.462 | 2.200 | 50.494 | 6 | 2.484 | 8 | 11 | 15 | 35 | 9E9 | 9E9 |
| 12.500 | 35.200 | 0.875 | 2.486 | 47.568 | 6 | 2.415 | 13 | 17 | 34 | 37 | 9E9 | 9E9 |
| 13.500 | 51.867 | 0.965 | 1.861 | 38.092 | 7 | 2.191 | 17 | 21 | 48 | 39 | 9E9 | 9E9 |
| 14.500 | 11.783 | 0.300 | 2.546 | 61.901 | 5 | 2.753 | 6 | 7 | 9E9 | 9E9 | 1457.560 | 5.209 |
| 15.500 | 9.550 | 0.177 | 1.850 | 59.885 | 5 | 2.705 | 5 | 6 | 9E9 | 9E9 | 1153.924 | 3.717 |
| 16.500 | 12.167 | 0.380 | 3.123 | 66.304 | 4 | 2.856 | 8 | 9 | 9E9 | 9E9 | 1492.677 | 4.908 |
| 17.500 | 31.683 | 0.512 | 1.615 | 42.443 | 6 | 2.294 | 12 | 13 | 26 | 37 | 9E9 | 9E9 |
| 18.500 | 56.667 | 0.725 | 1.279 | 31.642 | 7 | 2.039 | 18 | 20 | 47 | 39 | 9E9 | 9E9 |
| 19.500 | 75.933 | 0.607 | 0.799 | 19.684 | 8 | 1.757 | 18 | 19 | 58 | 41 | 9E9 | 9E9 |
| 20.500 | 38.900 | 0.664 | 1.708 | 42.259 | 7 | 2.290 | 12 | 12 | 31 | 37 | 9E9 | 9E9 |
| 21.500 | 13.350 | 0.338 | 2.534 | 63.670 | 5 | 2.794 | 6 | 6 | 9E9 | 9E9 | 1607.582 | 4.387 |
| 22.500 | 21.450 | 0.803 | 3.745 | 65.167 | 4 | 2.830 | 14 | 14 | 9E9 | 9E9 | 2677.469 | 7.994 |
| 23.500 | 25.983 | 0.887 | 3.412 | 61.458 | 5 | 2.742 | 12 | 12 | 9E9 | 9E9 | 3278.177 | 9.912 |
| 24.500 | 27.833 | 0.607 | 2.180 | 52.457 | 6 | 2.530 | 11 | 10 | 16 | 33 | 9E9 | 9E9 |
| 25.500 | 25.983 | 0.727 | 2.797 | 58.386 | 5 | 2.670 | 12 | 11 | 9E9 | 9E9 | 3259.275 | 9.151 |
| 26.500 | 20.567 | 0.688 | 3.347 | 65.102 | 5 | 2.828 | 10 | 9 | 9E9 | 9E9 | 2528.693 | 6.444 |
| 27.500 | 46.967 | 1.183 | 2.520 | 50.056 | 6 | 2.473 | 18 | 16 | 34 | 37 | 9E9 | 9E9 |
| 28.500 | 84.933 | 1.573 | 1.852 | 37.875 | 7 | 2.186 | 27 | 23 | 57 | 39 | 9E9 | 9E9 |
| 29.500 | 139.817 | 1.195 | 0.855 | 17.416 | 9 | 1.704 | 27 | 23 | 76 | 41 | 9E9 | 9E9 |
| 30.500 | 145.617 | 1.522 | 1.045 | 21.321 | 9 | 1.796 | 28 | 23 | 77 | 41 | 9E9 | 9E9 |
| 31.500 | 221.800 | 1.909 | 0.860 | 13.563 | 9 | 1.613 | 42 | 34 | 92 | 43 | 9E9 | 9E9 |
| 32.500 | 380.267 | 0.937 | 0.246 | 0.000 | 10 | 0.895 | 61 | 49 | 113 | 45 | 9E9 | 9E9 |
| 33.500 | 474.850 | 2.195 | 0.462 | 0.000 | 10 | 1.160 | 76 | 60 | 121 | 47 | 9E9 | 9E9 |
| 34.500 | 652.083 | 5.730 | 0.879 | 7.341 | 10 | 1.466 | 104 | 81 | 9E9 | 9E9 | 9E9 | 9E9 |
| 35.500 | 520.000 | 2.915 | 0.561 | 0.000 | 10 | 1.255 | 83 | 63 | 123 | 47 | 9E9 | 9E9 |
| 36.500 | 247.583 | 1.467 | 0.592 | 5.967 | 9 | 1.434 | 47 | 35 | 94 | 43 | 9E9 | 9E9 |
| 37.500 | 362.733 | 1.502 | 0.414 | 0.000 | 10 | 1.178 | 58 | 43 | 108 | 45 | 9E9 | 9E9 |
| 38.500 | 393.367 | 1.127 | 0.286 | 0.000 | 10 | 0.991 | 63 | 46 | 111 | 45 | 9E9 | 9E9 |
| 39.500 | 431.933 | 1.100 | 0.255 | 0.000 | 10 | 0.919 | 69 | 49 | 114 | 45 | 9E9 | 9E9 |
| 40.500 | 450.017 | 1.242 | 0.276 | 0.000 | 10 | 0.950 | 72 | 50 | 115 | 45 | 9E9 | 9E9 |
| 41.499 | 478.057 | 1.651 | 0.345 | 0.000 | 10 | 1.048 | 76 | 52 | 117 | 45 | 9E9 | 9E9 |
| 42.499 | 555.950 | 1.962 | 0.353 | 0.000 | 10 | 1.030 | 89 | 60 | 9E9 | 9E9 | 9E9 | 9E9 |
| 43.499 | 637.500 | 3.090 | 0.485 | 0.000 | 10 | 1.173 | 102 | 68 | 9E9 | 9E9 | 9E9 | 9E9 |
| 44.499 | 586.117 | 2.575 | 0.439 | 0.000 | 10 | 1.139 | 94 | 62 | 9E9 | 9E9 | 9E9 | 9E9 |
| 45.499 | 645.500 | 2.157 | 0.334 | 0.000 | 10 | 0.985 | 103 | 67 | 9E9 | 9E9 | 9E9 | 9E9 |
| 46.499 | 500.817 | 1.612 | 0.322 | 0.000 | 10 | 1.026 | 80 | 51 | 117 | 45 | 9E9 | 9E9 |
| 47.499 | 520.167 | 1.465 | 0.282 | 0.000 | 10 | 0.958 | 83 | 52 | 118 | 45 | 9E9 | 9E9 |
| 48.499 | 545.600 | 2.220 | 0.407 | 0.000 | 10 | 1.129 | 87 | 54 | 9E9 | 9E9 | 9E9 | 9E9 |
| 49.499 | 569.567 | 1.443 | 0.253 | 0.000 | 10 | 0.896 | 91 | 56 | 9E9 | 9E9 | 9E9 | 9E9 |
| 50.499 | 579.900 | 0.000 | 0.000 | 9E9 | 10 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 |





GROUP DELTA CONSULTANTS
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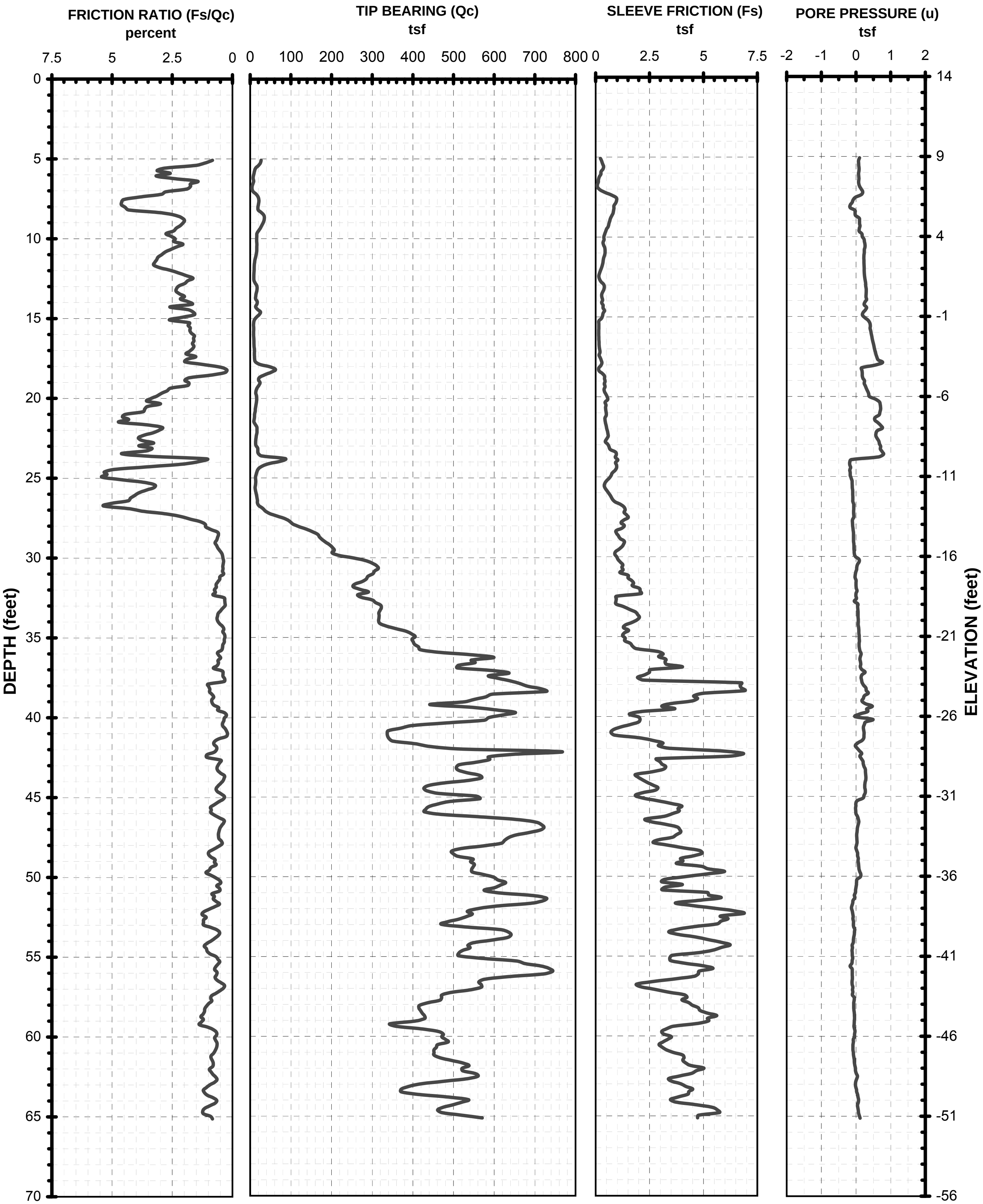
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126


| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-06 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 1-Mar-12 | A-13A |

```
"
"Output file from CPTINT - Version 5.2
"=====================================
"INPUT FILE: C:\CPTINT\C6.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           6.190
"Valid Zone Classification based on:    Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-----------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C6.csv  |---------------------------------------------------------------------------------
```

| Depth (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 21.950 | 0.242 | 1.101 | 11.429 | 6 | 1.563 | 8 | 12 | 83 | 50 | 9E9 | 9E9 |
| 1.500 | 25.600 | 0.343 | 1.341 | 19.825 | 6 | 1.761 | 10 | 15 | 65 | 45 | 9E9 | 9E9 |
| 2.500 | 10.850 | 0.085 | 0.783 | 21.178 | 6 | 1.793 | 4 | 6 | 21 | 39 | 9E9 | 9E9 |
| 3.500 | 13.400 | 0.088 | 0.659 | 19.549 | 6 | 1.754 | 5 | 8 | 22 | 39 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 21.667 | 0.155 | 0.715 | 18.076 | 7 | 1.719 | 7 | 11 | 36 | 39 | 9E9 | 9E9 |
| 5.500 | 9.450 | 0.128 | 1.358 | 42.528 | 5 | 2.296 | 5 | 8 | 9E9 | 9E9 | 1215.635 | 11.903 |
| 6.500 | 11.000 | 0.420 | 3.818 | 62.170 | 3 | 2.759 | 11 | 17 | 9E9 | 9E9 | 1414.184 | 11.658 |
| 7.500 | 27.133 | 0.765 | 2.819 | 48.159 | 5 | 2.429 | 13 | 20 | 9E9 | 9E9 | 3557.516 | 30.755 |
| 8.500 | 23.833 | 0.567 | 2.378 | 47.333 | 6 | 2.409 | 9 | 14 | 26 | 37 | 9E9 | 9E9 |
| 9.500 | 51.467 | 0.763 | 1.483 | 31.043 | 7 | 2.025 | 16 | 24 | 53 | 41 | 9E9 | 9E9 |
| 10.500 | 44.557 | 0.691 | 1.552 | 34.415 | 7 | 2.105 | 14 | 20 | 45 | 39 | 9E9 | 9E9 |
| 11.500 | 15.750 | 0.415 | 2.635 | 57.559 | 5 | 2.650 | 8 | 10 | 9E9 | 9E9 | 2006.824 | 8.827 |
| 12.500 | 17.017 | 0.455 | 2.674 | 57.891 | 5 | 2.658 | 8 | 10 | 9E9 | 9E9 | 2167.753 | 8.774 |
| 13.500 | 21.450 | 0.433 | 2.020 | 50.752 | 6 | 2.490 | 8 | 9 | 12 | 33 | 9E9 | 9E9 |
| 14.500 | 17.367 | 0.335 | 1.929 | 53.567 | 5 | 2.556 | 8 | 9 | 9E9 | 9E9 | 2195.865 | 7.401 |
| 15.500 | 8.750 | 0.243 | 2.781 | 70.549 | 4 | 2.956 | 6 | 6 | 9E9 | 9E9 | 1038.673 | 2.675 |
| 16.500 | 8.833 | 0.207 | 2.340 | 68.374 | 4 | 2.905 | 6 | 6 | 9E9 | 9E9 | 1044.006 | 2.493 |
| 17.500 | 16.383 | 0.507 | 3.093 | 65.332 | 5 | 2.833 | 8 | 8 | 9E9 | 9E9 | 2042.931 | 5.365 |
| 18.500 | 35.250 | 0.593 | 1.683 | 45.090 | 6 | 2.356 | 14 | 13 | 24 | 35 | 9E9 | 9E9 |
| 19.500 | 22.117 | 0.558 | 2.524 | 59.123 | 5 | 2.687 | 11 | 10 | 9E9 | 9E9 | 2788.840 | 6.901 |
| 20.500 | 13.400 | 0.326 | 2.431 | 65.984 | 5 | 2.849 | 6 | 5 | 9E9 | 9E9 | 1616.556 | 3.297 |
| 21.500 | 11.217 | 0.380 | 3.388 | 74.800 | 4 | 3.057 | 7 | 6 | 9E9 | 9E9 | 1321.176 | 2.490 |
| 22.500 | 18.200 | 0.600 | 3.297 | 67.840 | 5 | 2.893 | 9 | 7 | 9E9 | 9E9 | 2244.525 | 4.697 |
| 23.500 | 33.100 | 1.100 | 3.323 | 60.789 | 5 | 2.726 | 16 | 13 | 9E9 | 9E9 | 4221.314 | 10.053 |
| 24.500 | 21.283 | 0.777 | 3.649 | 68.330 | 4 | 2.904 | 14 | 11 | 9E9 | 9E9 | 2637.010 | 5.423 |
| 25.500 | 23.750 | 1.040 | 4.379 | 70.712 | 4 | 2.960 | 15 | 12 | 9E9 | 9E9 | 2957.645 | 6.085 |
| 26.500 | 20.967 | 0.865 | 4.126 | 71.467 | 4 | 2.978 | 13 | 10 | 9E9 | 9E9 | 2578.098 | 4.984 |
| 27.500 | 19.467 | 0.765 | 3.930 | 71.840 | 4 | 2.987 | 12 | 9 | 9E9 | 9E9 | 2367.652 | 4.366 |
| 28.500 | 162.583 | 1.617 | 0.994 | 20.818 | 9 | 1.784 | 31 | 23 | 77 | 41 | 9E9 | 9E9 |
| 29.500 | 559.583 | 3.217 | 0.575 | 0.000 | 10 | 1.266 | 89 | 65 | 9E9 | 9E9 | 9E9 | 9E9 |
| 30.500 | 708.050 | 5.512 | 0.778 | 4.622 | 10 | 1.402 | 113 | 81 | 9E9 | 9E9 | 9E9 | 9E9 |
| 31.500 | 686.500 | 2.890 | 0.421 | 0.000 | 10 | 1.076 | 110 | 77 | 9E9 | 9E9 | 9E9 | 9E9 |

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**CONE PENETRATION TEST RECORD**

**PROJECT:** Marina Del Rey

**CPT:** Kehoe Testing and Engineering

**DATE:** 1-Mar-12

**HOLE ID**
CPT-12-07

**FIGURE NO.**
A-14A

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C7.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           3.660
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C7.csv  |------------------------------------------------------------------------------------
```

| " Depth (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 22.600 | 0.162 | 0.715 | 1.026 | 7 | 1.317 | 7 | 11 | 85 | 50 | 9E9 | 9E9 |
| 1.500 | 18.617 | 0.205 | 1.101 | 17.309 | 6 | 1.701 | 7 | 11 | 54 | 45 | 9E9 | 9E9 |
| 2.500 | 28.033 | 0.393 | 1.403 | 23.457 | 6 | 1.846 | 11 | 17 | 59 | 43 | 9E9 | 9E9 |
| 3.500 | 42.417 | 0.413 | 0.974 | 14.923 | 7 | 1.645 | 14 | 21 | 67 | 45 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 28.183 | 0.367 | 1.301 | 26.887 | 6 | 1.927 | 11 | 17 | 46 | 41 | 9E9 | 9E9 |
| 5.500 | 17.667 | 0.297 | 1.679 | 38.954 | 6 | 2.212 | 7 | 11 | 24 | 37 | 9E9 | 9E9 |
| 6.500 | 6.667 | 0.138 | 2.075 | 56.982 | 4 | 2.637 | 4 | 6 | 9E9 | 9E9 | 836.423 | 6.071 |
| 7.500 | 17.483 | 0.712 | 4.071 | 59.996 | 4 | 2.708 | 11 | 17 | 9E9 | 9E9 | 2271.017 | 17.731 |
| 8.500 | 28.233 | 0.792 | 2.804 | 48.784 | 5 | 2.443 | 14 | 21 | 9E9 | 9E9 | 3694.329 | 27.818 |
| 9.500 | 23.017 | 0.535 | 2.324 | 48.438 | 6 | 2.435 | 9 | 14 | 22 | 37 | 9E9 | 9E9 |
| 10.500 | 16.000 | 0.397 | 2.482 | 55.219 | 5 | 2.595 | 8 | 11 | 9E9 | 9E9 | 2040.884 | 10.128 |
| 11.500 | 11.000 | 0.337 | 3.061 | 65.046 | 4 | 2.827 | 7 | 9 | 9E9 | 9E9 | 1366.993 | 5.487 |
| 12.500 | 11.000 | 0.222 | 2.015 | 58.461 | 5 | 2.671 | 5 | 6 | 9E9 | 9E9 | 1354.543 | 5.021 |
| 13.500 | 15.417 | 0.332 | 2.151 | 55.552 | 5 | 2.603 | 7 | 9 | 9E9 | 9E9 | 1940.027 | 7.503 |
| 14.500 | 18.567 | 0.342 | 1.840 | 50.742 | 6 | 2.490 | 7 | 8 | 7 | 33 | 9E9 | 9E9 |
| 15.500 | 8.817 | 0.168 | 1.909 | 62.802 | 5 | 2.774 | 4 | 5 | 9E9 | 9E9 | 1046.012 | 3.169 |
| 16.500 | 9.367 | 0.155 | 1.655 | 60.212 | 5 | 2.713 | 4 | 4 | 9E9 | 9E9 | 1102.470 | 3.243 |
| 17.500 | 13.267 | 0.218 | 1.646 | 55.371 | 5 | 2.599 | 6 | 7 | 9E9 | 9E9 | 1610.155 | 4.997 |
| 18.500 | 40.650 | 0.278 | 0.685 | 24.888 | 7 | 1.880 | 13 | 14 | 34 | 37 | 9E9 | 9E9 |
| 19.500 | 17.783 | 0.427 | 2.399 | 58.463 | 5 | 2.672 | 9 | 9 | 9E9 | 9E9 | 2207.640 | 6.854 |
| 20.500 | 13.771 | 0.491 | 3.568 | 69.962 | 4 | 2.943 | 9 | 9 | 9E9 | 9E9 | 1654.097 | 4.602 |
| 21.500 | 12.767 | 0.470 | 3.681 | 72.063 | 4 | 2.992 | 8 | 8 | 9E9 | 9E9 | 1515.901 | 3.979 |
| 22.500 | 14.800 | 0.537 | 3.626 | 70.072 | 4 | 2.945 | 9 | 9 | 9E9 | 9E9 | 1776.855 | 4.684 |
| 23.500 | 41.100 | 0.853 | 2.076 | 46.830 | 6 | 2.397 | 16 | 15 | 31 | 37 | 9E9 | 9E9 |
| 24.500 | 22.933 | 0.873 | 3.808 | 65.593 | 4 | 2.840 | 15 | 14 | 9E9 | 9E9 | 2862.853 | 7.912 |
| 25.500 | 13.233 | 0.492 | 3.715 | 72.742 | 4 | 3.008 | 8 | 7 | 9E9 | 9E9 | 1561.012 | 3.584 |
| 26.500 | 20.050 | 0.917 | 4.572 | 71.526 | 3 | 2.979 | 19 | 17 | 9E9 | 9E9 | 2461.966 | 6.128 |
| 27.500 | 73.200 | 1.352 | 1.847 | 39.206 | 7 | 2.218 | 23 | 20 | 51 | 39 | 9E9 | 9E9 |
| 28.500 | 154.317 | 1.113 | 0.721 | 12.880 | 9 | 1.597 | 30 | 26 | 80 | 43 | 9E9 | 9E9 |
| 29.500 | 201.750 | 1.127 | 0.558 | 5.252 | 9 | 1.417 | 39 | 33 | 90 | 43 | 9E9 | 9E9 |
| 30.500 | 295.417 | 1.153 | 0.390 | 0.000 | 10 | 1.162 | 47 | 39 | 104 | 45 | 9E9 | 9E9 |
| 31.500 | 276.086 | 1.613 | 0.584 | 3.593 | 9 | 1.378 | 53 | 43 | 101 | 45 | 9E9 | 9E9 |
| 32.500 | 292.650 | 1.330 | 0.454 | 0.000 | 10 | 1.248 | 47 | 37 | 102 | 45 | 9E9 | 9E9 |
| 33.500 | 317.983 | 1.768 | 0.556 | 1.732 | 10 | 1.334 | 51 | 40 | 105 | 45 | 9E9 | 9E9 |
| 34.500 | 366.650 | 1.408 | 0.384 | 0.000 | 10 | 1.127 | 59 | 45 | 110 | 45 | 9E9 | 9E9 |
| 35.500 | 416.117 | 1.795 | 0.431 | 0.000 | 10 | 1.162 | 66 | 50 | 114 | 45 | 9E9 | 9E9 |
| 36.500 | 544.017 | 3.303 | 0.607 | 0.102 | 10 | 1.296 | 87 | 64 | 9E9 | 9E9 | 9E9 | 9E9 |
| 37.500 | 622.000 | 3.037 | 0.488 | 0.000 | 10 | 1.163 | 99 | 72 | 9E9 | 9E9 | 9E9 | 9E9 |
| 38.500 | 642.333 | 5.780 | 0.900 | 8.437 | 10 | 1.492 | 103 | 74 | 9E9 | 9E9 | 9E9 | 9E9 |
| 39.500 | 563.433 | 3.050 | 0.541 | 0.000 | 10 | 1.240 | 90 | 63 | 9E9 | 9E9 | 9E9 | 9E9 |
| 40.500 | 459.150 | 1.585 | 0.345 | 0.000 | 10 | 1.055 | 73 | 50 | 116 | 45 | 9E9 | 9E9 |
| 41.499 | 390.200 | 2.239 | 0.574 | 2.175 | 10 | 1.345 | 62 | 42 | 109 | 45 | 9E9 | 9E9 |
| 42.499 | 610.417 | 4.630 | 0.758 | 5.229 | 10 | 1.417 | 97 | 65 | 9E9 | 9E9 | 9E9 | 9E9 |
| 43.499 | 536.417 | 2.495 | 0.465 | 0.000 | 10 | 1.184 | 86 | 57 | 9E9 | 9E9 | 9E9 | 9E9 |
| 44.499 | 465.867 | 2.445 | 0.525 | 0.000 | 10 | 1.276 | 74 | 48 | 115 | 45 | 9E9 | 9E9 |
| 45.499 | 469.733 | 3.367 | 0.717 | 6.110 | 10 | 1.437 | 75 | 48 | 115 | 45 | 9E9 | 9E9 |
| 46.499 | 641.133 | 3.102 | 0.484 | 0.000 | 10 | 1.183 | 102 | 64 | 9E9 | 9E9 | 9E9 | 9E9 |
| 47.499 | 653.833 | 3.445 | 0.527 | 0.000 | 10 | 1.227 | 104 | 65 | 9E9 | 9E9 | 9E9 | 9E9 |
| 48.499 | 524.283 | 4.278 | 0.816 | 8.581 | 10 | 1.496 | 84 | 52 | 9E9 | 9E9 | 9E9 | 9E9 |
| 49.499 | 551.017 | 4.835 | 0.877 | 9.984 | 10 | 1.529 | 88 | 53 | 9E9 | 9E9 | 9E9 | 9E9 |
| 50.499 | 604.583 | 3.460 | 0.572 | 0.000 | 10 | 1.292 | 97 | 58 | 9E9 | 9E9 | 9E9 | 9E9 |
| 51.499 | 675.417 | 4.872 | 0.721 | 4.484 | 10 | 1.399 | 108 | 64 | 9E9 | 9E9 | 9E9 | 9E9 |
| 52.499 | 520.214 | 6.017 | 1.157 | 16.894 | 9 | 1.692 | 100 | 58 | 116 | 45 | 9E9 | 9E9 |
| 53.499 | 608.550 | 4.247 | 0.698 | 4.655 | 10 | 1.403 | 97 | 56 | 9E9 | 9E9 | 9E9 | 9E9 |
| 54.499 | 528.700 | 5.278 | 0.998 | 13.709 | 9 | 1.616 | 101 | 57 | 9E9 | 9E9 | 9E9 | 9E9 |
| 55.499 | 682.617 | 4.382 | 0.642 | 2.216 | 10 | 1.346 | 109 | 61 | 9E9 | 9E9 | 9E9 | 9E9 |
| 56.499 | 605.000 | 3.278 | 0.542 | 0.000 | 10 | 1.282 | 97 | 54 | 9E9 | 9E9 | 9E9 | 9E9 |
| 57.499 | 479.983 | 3.793 | 0.790 | 9.663 | 10 | 1.521 | 77 | 42 | 111 | 45 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58.499 | 421.850 | 5.008 | 1.187 | 19.645 | 9 | 1.756 | 81 | 44 | 106 | 43 | 9E9 | 9E9 |
| 59.499 | 411.817 | 3.853 | 0.936 | 14.805 | 9 | 1.642 | 79 | 42 | 104 | 43 | 9E9 | 9E9 |
| 60.499 | 468.050 | 3.213 | 0.687 | 7.236 | 10 | 1.464 | 75 | 40 | 109 | 45 | 9E9 | 9E9 |
| 61.499 | 488.117 | 4.052 | 0.830 | 11.060 | 10 | 1.554 | 78 | 41 | 110 | 45 | 9E9 | 9E9 |
| 62.499 | 511.929 | 4.130 | 0.807 | 10.176 | 10 | 1.533 | 82 | 42 | 112 | 45 | 9E9 | 9E9 |
| 63.499 | 427.883 | 4.097 | 0.957 | 15.462 | 9 | 1.658 | 82 | 42 | 105 | 43 | 9E9 | 9E9 |
| 64.499 | 490.933 | 4.997 | 1.018 | 15.768 | 9 | 1.665 | 94 | 48 | 110 | 45 | 9E9 | 9E9 |
| 65.499 | 564.300 | 4.747 | 0.841 | 10.633 | 10 | 1.544 | 90 | 45 | 9E9 | 9E9 | 9E9 | 9E9 |
| 66.499 | 628.667 | 4.652 | 0.740 | 7.106 | 10 | 1.461 | 100 | 50 | 9E9 | 9E9 | 9E9 | 9E9 |
| 67.499 | 588.417 | 5.458 | 0.928 | 12.667 | 10 | 1.592 | 94 | 47 | 9E9 | 9E9 | 9E9 | 9E9 |
| 68.499 | 546.550 | 5.992 | 1.096 | 16.988 | 9 | 1.694 | 105 | 53 | 9E9 | 9E9 | 9E9 | 9E9 |
| 69.499 | 444.800 | 7.700 | 1.731 | 28.676 | 8 | 1.969 | 107 | 54 | 104 | 43 | 9E9 | 9E9 |

Admirality Way
Marina Del Rey, CA

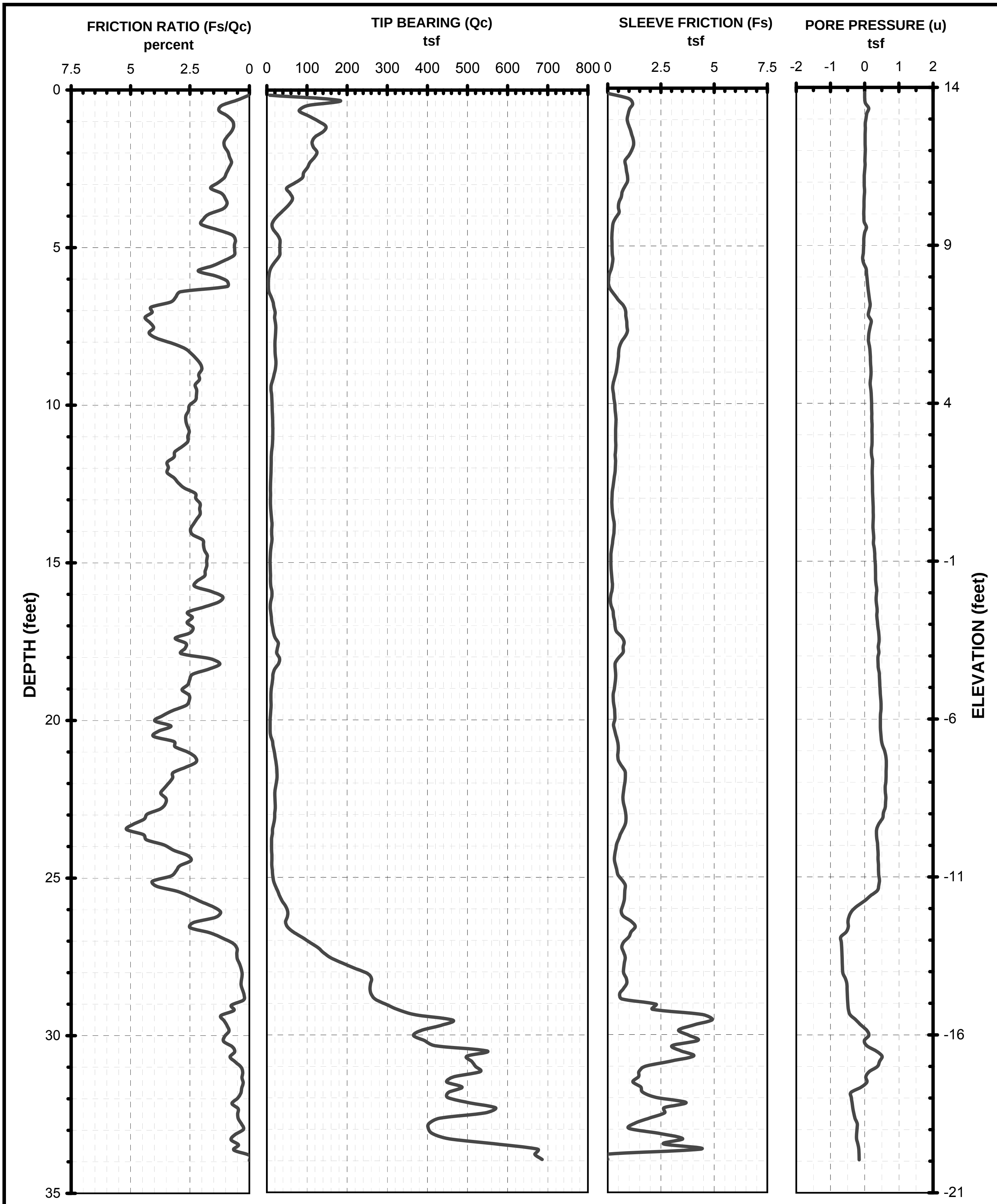
CPT-12-07

CPT Shear Wave Measurements

| Depth (ft) | Travel Distance (ft) | S-Wave Arrival (msec) | S-Wave Velocity from Surface (ft/sec) | Interval S-Wave Velocity (ft/sec) |
|---|---|---|---|---|
| 5.25 | 7.25 | 12.17 | 595.73 | |
| 10.10 | 11.27 | 20.13 | 559.85 | 505.01 |
| 15.11 | 15.92 | 29.95 | 531.41 | 473.11 |
| 20.13 | 20.74 | 37.42 | 554.29 | 646.04 |
| 25.10 | 25.59 | 44.03 | 581.27 | 733.96 |
| 30.08 | 30.49 | 50.89 | 599.19 | 714.22 |
| 35.06 | 35.41 | 55.80 | 634.67 | 1002.45 |
| 40.02 | 40.33 | 60.72 | 664.21 | 999.27 |
| 45.17 | 45.45 | 64.71 | 702.30 | 1281.89 |
| 50.02 | 50.27 | 67.33 | 746.61 | 1840.99 |
| 55.19 | 55.42 | 70.22 | 789.18 | 1780.88 |
| 60.06 | 60.27 | 73.44 | 820.64 | 1506.75 |
| 65.21 | 65.40 | 78.20 | 836.34 | 1078.50 |
| 69.70 | 69.88 | 81.11 | 861.54 | 1538.73 |

Shear Wave Source Offset = 5 ft

S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival
Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

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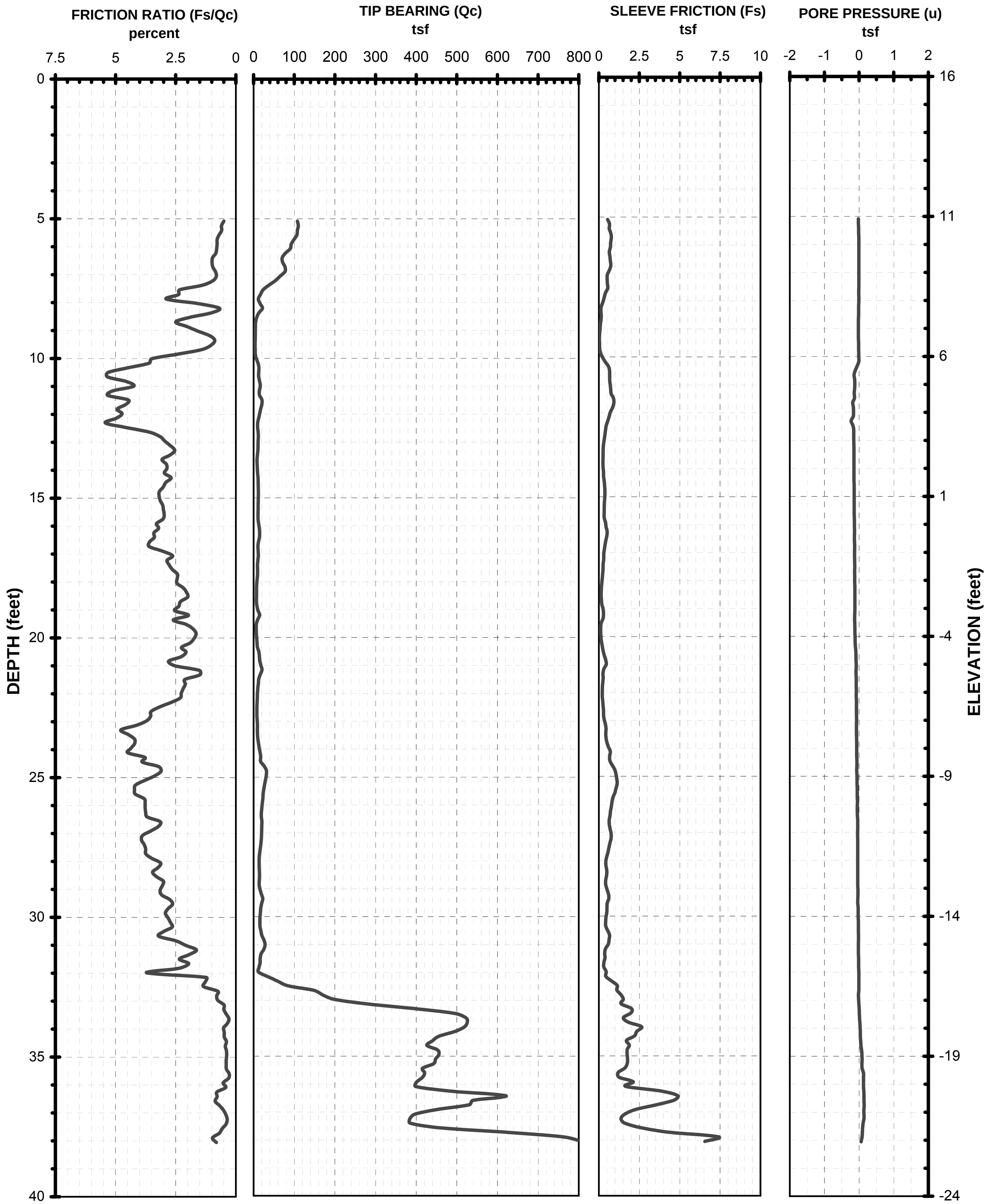
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-08 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 2-Mar-12 | A-15A |

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C8.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                  0.830
"Value for Water Table (in m):            1.830
"Valid Zone Classification based on:      Rf
"Missing unit weight to start depth:      18.860
"Method for calculating Su:               Nk
"Value of the constant Nk:                15.000
"Method used to calculate OCR:            Su/EOS
"(Su/EOS) for normal consolidation:       0.250
"Define Zone 6 for Sand Parameters?       YES
"Sand Compressibility for calc Dr:        Moderate
"Method for Friction Angle:               Robertson & Campanella
"Vertical Flow Gradient, i (- up):        +0.000
"CPT to SPT N60 Conversion:               Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-----------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C8.csv  |-------------------------------------------------------------------------------------
" Depth     Qt(avg)   Fs(avg)   Rf        FC        Rf Zone   Ic        Spt N     Spt N1    Dr        Phi       Su        OCR
" (feet)    (TSF)     (TSF)     (%)       (%)       (zone #)  index     (blow/ft) (blow/ft) (%)       (degree)  (psf)     (ratio)
"-------------------------------------------------------------------------------------------------------------------------------
    0.500   100.550     0.842     0.837     8.295     8         1.489    24        36        142       50           9E9       9E9
    1.500   127.150     1.115     0.877     5.901     8         1.432    30        45        128       50           9E9       9E9
    2.500    96.100     0.898     0.935     7.838     8         1.478    23        35        106       50           9E9       9E9
    3.500    50.650     0.613     1.211    18.542     7         1.730    16        24         74       45           9E9       9E9
```

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 23.317 | 0.242 | 1.036 | 24.420 | 6 | 1.869 | 9 | 14 | 38 | 41 | 9E9 | 9E9 |
| 5.500 | 18.833 | 0.182 | 0.965 | 27.817 | 6 | 1.949 | 7 | 11 | 26 | 39 | 9E9 | 9E9 |
| 6.500 | 9.417 | 0.300 | 3.186 | 60.217 | 4 | 2.713 | 6 | 9 | 9E9 | 9E9 | 1202.515 | 9.883 |
| 7.500 | 21.033 | 0.868 | 4.128 | 57.645 | 4 | 2.652 | 13 | 20 | 9E9 | 9E9 | 2741.413 | 25.201 |
| 8.500 | 21.233 | 0.518 | 2.441 | 47.556 | 5 | 2.414 | 10 | 15 | 9E9 | 9E9 | 2759.747 | 23.202 |
| 9.500 | 13.283 | 0.293 | 2.208 | 51.834 | 5 | 2.515 | 6 | 9 | 9E9 | 9E9 | 1691.299 | 11.596 |
| 10.500 | 14.100 | 0.364 | 2.584 | 54.843 | 5 | 2.586 | 7 | 11 | 9E9 | 9E9 | 1792.530 | 11.587 |
| 11.500 | 11.967 | 0.367 | 3.064 | 60.840 | 4 | 2.728 | 8 | 12 | 9E9 | 9E9 | 1499.690 | 8.651 |
| 12.500 | 9.467 | 0.267 | 2.817 | 63.083 | 4 | 2.780 | 6 | 9 | 9E9 | 9E9 | 1153.820 | 5.837 |
| 13.500 | 11.033 | 0.245 | 2.221 | 57.377 | 5 | 2.646 | 5 | 7 | 9E9 | 9E9 | 1354.760 | 6.702 |
| 14.500 | 10.483 | 0.207 | 1.971 | 56.706 | 5 | 2.630 | 5 | 7 | 9E9 | 9E9 | 1273.403 | 5.845 |
| 15.500 | 9.717 | 0.185 | 1.904 | 57.970 | 5 | 2.660 | 5 | 7 | 9E9 | 9E9 | 1156.482 | 4.896 |
| 16.500 | 10.583 | 0.210 | 1.984 | 58.110 | 5 | 2.663 | 5 | 7 | 9E9 | 9E9 | 1272.955 | 5.229 |
| 17.500 | 22.050 | 0.602 | 2.729 | 54.789 | 5 | 2.585 | 11 | 14 | 9E9 | 9E9 | 2785.178 | 13.179 |
| 18.500 | 20.733 | 0.385 | 1.857 | 48.800 | 6 | 2.444 | 8 | 10 | 13 | 35 | 9E9 | 9E9 |
| 19.500 | 10.167 | 0.293 | 2.885 | 67.374 | 4 | 2.882 | 6 | 7 | 9E9 | 9E9 | 1184.146 | 4.095 |
| 20.500 | 11.786 | 0.390 | 3.309 | 68.275 | 4 | 2.903 | 8 | 10 | 9E9 | 9E9 | 1393.976 | 4.795 |
| 21.500 | 23.733 | 0.682 | 2.872 | 56.876 | 5 | 2.634 | 11 | 13 | 9E9 | 9E9 | 2977.330 | 11.819 |
| 22.500 | 20.550 | 0.763 | 3.715 | 64.076 | 4 | 2.804 | 13 | 15 | 9E9 | 9E9 | 2540.158 | 9.267 |
| 23.500 | 14.700 | 0.665 | 4.524 | 72.528 | 3 | 3.003 | 14 | 15 | 9E9 | 9E9 | 1756.229 | 5.596 |
| 24.500 | 13.033 | 0.380 | 2.916 | 66.468 | 4 | 2.860 | 8 | 9 | 9E9 | 9E9 | 1525.777 | 4.502 |
| 25.500 | 30.217 | 0.758 | 2.510 | 52.826 | 6 | 2.539 | 12 | 13 | 22 | 35 | 9E9 | 9E9 |
| 26.500 | 59.300 | 0.973 | 1.641 | 37.040 | 7 | 2.166 | 19 | 19 | 47 | 39 | 9E9 | 9E9 |
| 27.500 | 157.367 | 0.752 | 0.478 | 2.551 | 9 | 1.353 | 30 | 30 | 85 | 43 | 9E9 | 9E9 |
| 28.500 | 259.500 | 0.747 | 0.288 | 0.000 | 10 | 1.001 | 41 | 40 | 103 | 45 | 9E9 | 9E9 |
| 29.500 | 380.133 | 3.520 | 0.926 | 9.912 | 9 | 1.527 | 73 | 69 | 117 | 47 | 9E9 | 9E9 |
| 30.500 | 456.050 | 3.583 | 0.786 | 5.338 | 10 | 1.419 | 73 | 68 | 124 | 47 | 9E9 | 9E9 |
| 31.500 | 479.357 | 1.616 | 0.337 | 0.000 | 10 | 0.964 | 77 | 70 | 125 | 47 | 9E9 | 9E9 |
| 32.500 | 475.633 | 2.208 | 0.464 | 0.000 | 10 | 1.138 | 76 | 67 | 124 | 47 | 9E9 | 9E9 |
| 33.500 | 578.033 | 2.165 | 0.375 | 0.000 | 10 | 1.000 | 92 | 80 | 9E9 | 9E9 | 9E9 | 9E9 |





GROUP DELTA CONSULTANTS

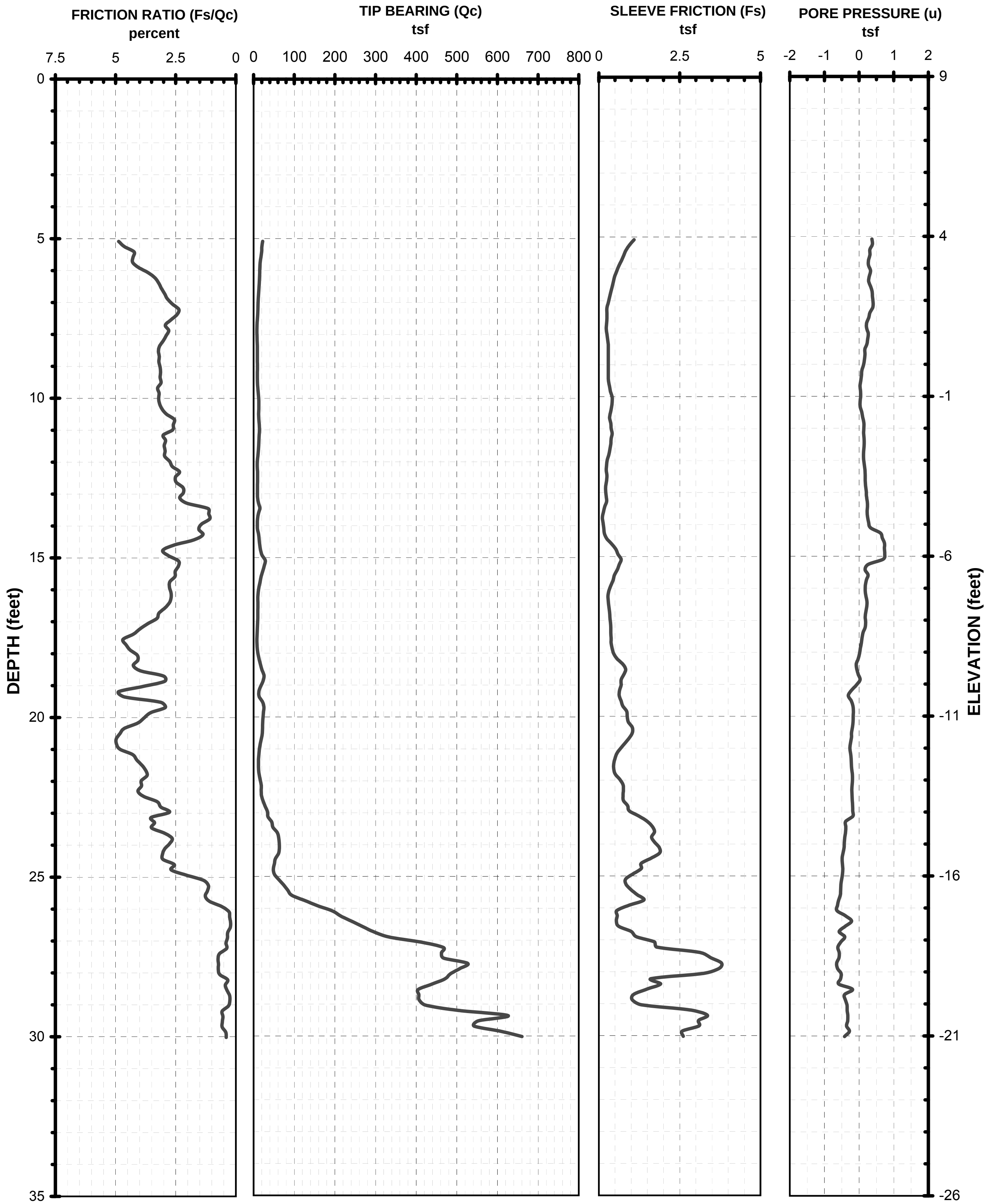
370 Amapola Avenue, Suite 212, Torrance, CA 90501
32 Mauchly, Suite B, Irvine, CA 92618
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126


| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-09 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 1-Mar-12 | A-16A |

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C9.csv
"----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           4.270
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C9.csv  |------------------------------------------------------------------------------------
```

| Depth (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 17.017 | 0.227 | 1.332 | 16.448 | 6 | 1.681 | 7 | 11 | 74 | 50 | 9E9 | 9E9 |
| 1.500 | 20.317 | 0.378 | 1.862 | 28.411 | 6 | 1.963 | 8 | 12 | 57 | 45 | 9E9 | 9E9 |
| 2.500 | 39.100 | 0.297 | 0.759 | 7.389 | 7 | 1.467 | 12 | 18 | 72 | 45 | 9E9 | 9E9 |
| 3.500 | 18.817 | 0.213 | 1.134 | 25.448 | 6 | 1.893 | 7 | 11 | 36 | 41 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 48.167 | 0.310 | 0.644 | 7.148 | 8 | 1.462 | 12 | 18 | 67 | 43 | 9E9 | 9E9 |
| 5.500 | 104.100 | 0.680 | 0.653 | 2.793 | 8 | 1.359 | 25 | 38 | 92 | 45 | 9E9 | 9E9 |
| 6.500 | 77.500 | 0.693 | 0.895 | 13.224 | 8 | 1.605 | 19 | 29 | 77 | 43 | 9E9 | 9E9 |
| 7.500 | 34.783 | 0.477 | 1.370 | 30.957 | 7 | 2.023 | 11 | 17 | 43 | 39 | 9E9 | 9E9 |
| 8.500 | 11.333 | 0.150 | 1.324 | 45.440 | 5 | 2.364 | 5 | 8 | 9E9 | 9E9 | 1442.464 | 8.560 |
| 9.500 | 3.950 | 0.055 | 1.392 | 63.727 | 1 | 2.796 | 2 | 3 | 9E9 | 9E9 | 450.430 | 1.761 |
| 10.500 | 12.357 | 0.557 | 4.509 | 69.291 | 3 | 2.927 | 12 | 17 | 9E9 | 9E9 | 1564.173 | 7.426 |
| 11.500 | 16.967 | 0.815 | 4.804 | 67.979 | 3 | 2.896 | 16 | 21 | 9E9 | 9E9 | 2172.820 | 9.948 |
| 12.500 | 11.100 | 0.455 | 4.099 | 70.902 | 3 | 2.965 | 11 | 14 | 9E9 | 9E9 | 1384.277 | 5.082 |
| 13.500 | 9.500 | 0.265 | 2.789 | 66.972 | 4 | 2.872 | 6 | 7 | 9E9 | 9E9 | 1162.717 | 3.706 |
| 14.500 | 11.133 | 0.333 | 2.994 | 66.843 | 4 | 2.869 | 7 | 8 | 9E9 | 9E9 | 1368.102 | 4.248 |
| 15.500 | 11.317 | 0.350 | 3.093 | 67.718 | 4 | 2.890 | 7 | 8 | 9E9 | 9E9 | 1386.771 | 4.147 |
| 16.500 | 12.850 | 0.432 | 3.359 | 68.017 | 4 | 2.897 | 8 | 9 | 9E9 | 9E9 | 1585.488 | 4.711 |
| 17.500 | 10.000 | 0.265 | 2.650 | 67.706 | 4 | 2.889 | 6 | 6 | 9E9 | 9E9 | 1195.162 | 3.183 |
| 18.500 | 7.467 | 0.165 | 2.210 | 69.574 | 4 | 2.933 | 5 | 5 | 9E9 | 9E9 | 853.738 | 2.014 |
| 19.500 | 9.233 | 0.197 | 2.130 | 66.154 | 5 | 2.853 | 4 | 4 | 9E9 | 9E9 | 1076.905 | 2.596 |
| 20.500 | 12.186 | 0.281 | 2.309 | 63.889 | 5 | 2.799 | 6 | 6 | 9E9 | 9E9 | 1460.432 | 3.667 |
| 21.500 | 13.567 | 0.250 | 1.843 | 58.895 | 5 | 2.682 | 6 | 6 | 9E9 | 9E9 | 1636.602 | 4.085 |
| 22.500 | 8.600 | 0.270 | 3.140 | 75.444 | 3 | 3.072 | 8 | 7 | 9E9 | 9E9 | 966.204 | 2.044 |
| 23.500 | 10.733 | 0.467 | 4.348 | 78.400 | 3 | 3.142 | 10 | 9 | 9E9 | 9E9 | 1244.773 | 2.712 |
| 24.500 | 23.300 | 0.823 | 3.534 | 64.566 | 5 | 2.815 | 11 | 10 | 9E9 | 9E9 | 2912.426 | 7.582 |
| 25.500 | 24.883 | 0.995 | 3.999 | 66.501 | 4 | 2.861 | 16 | 14 | 9E9 | 9E9 | 3115.252 | 7.976 |
| 26.500 | 19.817 | 0.695 | 3.507 | 67.194 | 4 | 2.877 | 13 | 11 | 9E9 | 9E9 | 2429.127 | 5.664 |
| 27.500 | 16.917 | 0.642 | 3.793 | 71.107 | 4 | 2.970 | 11 | 9 | 9E9 | 9E9 | 2034.355 | 4.407 |
| 28.500 | 13.933 | 0.447 | 3.206 | 71.116 | 4 | 2.970 | 9 | 7 | 9E9 | 9E9 | 1628.470 | 3.242 |
| 29.500 | 18.617 | 0.537 | 2.883 | 65.414 | 5 | 2.835 | 9 | 7 | 9E9 | 9E9 | 2245.073 | 4.710 |
| 30.500 | 18.383 | 0.518 | 2.820 | 65.525 | 5 | 2.838 | 9 | 7 | 9E9 | 9E9 | 2205.949 | 4.483 |
| 31.500 | 18.386 | 0.401 | 2.183 | 61.299 | 5 | 2.738 | 9 | 7 | 9E9 | 9E9 | 2200.168 | 4.350 |
| 32.500 | 116.567 | 1.053 | 0.904 | 21.802 | 8 | 1.807 | 28 | 22 | 66 | 41 | 9E9 | 9E9 |
| 33.500 | 457.200 | 1.892 | 0.414 | 0.000 | 10 | 1.118 | 73 | 56 | 118 | 45 | 9E9 | 9E9 |
| 34.500 | 454.317 | 1.940 | 0.427 | 0.000 | 10 | 1.140 | 73 | 55 | 118 | 45 | 9E9 | 9E9 |
| 35.500 | 423.933 | 1.618 | 0.382 | 0.000 | 10 | 1.103 | 68 | 50 | 115 | 45 | 9E9 | 9E9 |
| 36.500 | 504.650 | 3.485 | 0.691 | 3.654 | 10 | 1.379 | 81 | 59 | 121 | 47 | 9E9 | 9E9 |
| 37.500 | 501.933 | 3.152 | 0.628 | 1.711 | 10 | 1.334 | 80 | 57 | 120 | 45 | 9E9 | 9E9 |
| 38.500 | 808.700 | 6.560 | 0.811 | 5.132 | 10 | 1.414 | 129 | 90 | 9E9 | 9E9 | 9E9 | 9E9 |

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**CONE PENETRATION TEST RECORD**

**PROJECT:** Marina Del Rey

**CPT:** Kehoe Testing and Engineering

**DATE:** 2-Mar-12

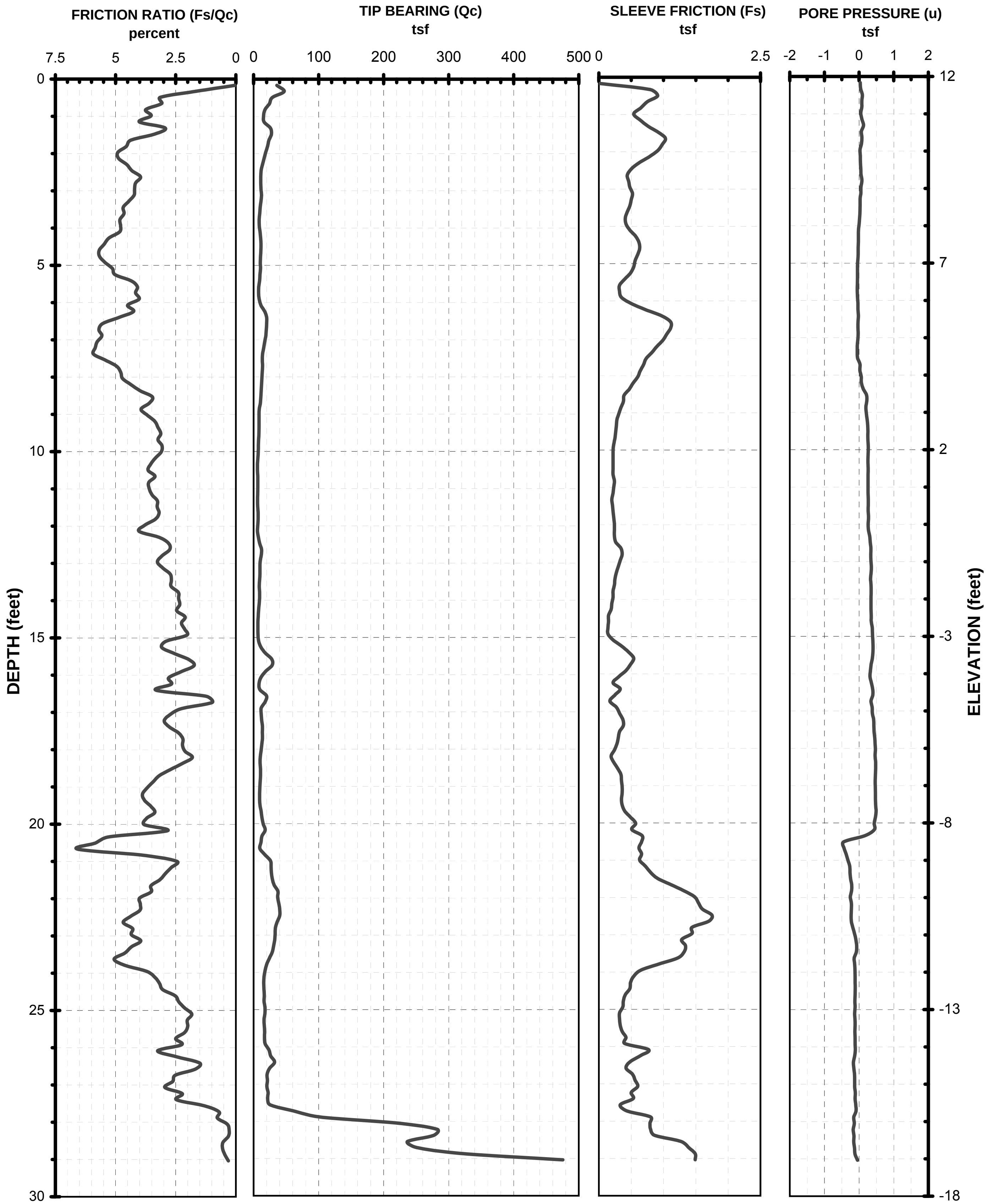
**HOLE ID** CPT-12-10

**FIGURE NO.** A-17A

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C10.csv
"-----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           3.960
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C10.csv  |------------------------------------------------------------------------------------
```

| " Depth<br>" (feet) | Qt(avg)<br>(TSF) | Fs(avg)<br>(TSF) | Rf<br>(%) | FC<br>(%) | Rf Zone<br>(zone #) | Ic<br>index | Spt N<br>(blow/ft) | Spt N1<br>(blow/ft) | Dr<br>(%) | Phi<br>(degree) | Su<br>(psf) | OCR<br>(ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 13.633 | 0.292 | 2.139 | 28.316 | 5 | 1.961 | 7 | 11 | 9E9 | 9E9 | 1814.249 | 400.851 |
| 1.500 | 8.083 | 0.133 | 1.649 | 33.147 | 5 | 2.075 | 4 | 6 | 9E9 | 9E9 | 1063.829 | 52.096 |
| 2.500 | 8.700 | 0.315 | 3.621 | 53.810 | 3 | 2.562 | 8 | 12 | 9E9 | 9E9 | 1133.623 | 29.784 |
| 3.500 | 11.767 | 0.285 | 2.422 | 45.716 | 5 | 2.371 | 6 | 9 | 9E9 | 9E9 | 1536.838 | 28.610 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 18.933 | 0.638 | 3.371 | 50.413 | 5 | 2.482 | 9 | 14 | 9E9 | 9E9 | 2484.638 | 38.097 |
| 5.500 | 18.783 | 0.828 | 4.410 | 58.046 | 3 | 2.662 | 18 | 27 | 9E9 | 9E9 | 2452.016 | 29.021 |
| 6.500 | 13.533 | 0.433 | 3.202 | 56.530 | 4 | 2.626 | 9 | 14 | 9E9 | 9E9 | 1741.438 | 15.305 |
| 7.500 | 9.617 | 0.252 | 2.617 | 58.418 | 4 | 2.670 | 6 | 9 | 9E9 | 9E9 | 1213.299 | 8.155 |
| 8.500 | 9.000 | 0.280 | 3.111 | 63.937 | 4 | 2.801 | 6 | 9 | 9E9 | 9E9 | 1127.497 | 6.368 |
| 9.500 | 9.850 | 0.310 | 3.147 | 64.223 | 4 | 2.807 | 6 | 9 | 9E9 | 9E9 | 1237.302 | 6.228 |
| 10.500 | 13.200 | 0.379 | 2.868 | 60.053 | 5 | 2.709 | 6 | 9 | 9E9 | 9E9 | 1674.175 | 8.025 |
| 11.500 | 11.817 | 0.345 | 2.920 | 62.994 | 4 | 2.778 | 8 | 11 | 9E9 | 9E9 | 1479.138 | 6.137 |
| 12.500 | 9.617 | 0.230 | 2.392 | 63.393 | 4 | 2.788 | 6 | 7 | 9E9 | 9E9 | 1177.725 | 4.161 |
| 13.500 | 11.400 | 0.172 | 1.506 | 53.945 | 5 | 2.565 | 5 | 6 | 9E9 | 9E9 | 1407.560 | 4.842 |
| 14.500 | 14.867 | 0.343 | 2.309 | 58.463 | 5 | 2.672 | 7 | 8 | 9E9 | 9E9 | 1850.785 | 6.521 |
| 15.500 | 21.050 | 0.530 | 2.518 | 55.747 | 5 | 2.607 | 10 | 11 | 9E9 | 9E9 | 2676.163 | 9.888 |
| 16.500 | 10.583 | 0.310 | 2.929 | 68.119 | 4 | 2.899 | 7 | 8 | 9E9 | 9E9 | 1276.518 | 3.754 |
| 17.500 | 8.950 | 0.378 | 4.227 | 77.570 | 3 | 3.122 | 9 | 10 | 9E9 | 9E9 | 1050.680 | 2.828 |
| 18.500 | 18.817 | 0.677 | 3.596 | 64.991 | 4 | 2.825 | 12 | 13 | 9E9 | 9E9 | 2363.019 | 7.493 |
| 19.500 | 19.383 | 0.708 | 3.654 | 65.235 | 4 | 2.831 | 12 | 12 | 9E9 | 9E9 | 2430.591 | 7.475 |
| 20.500 | 19.857 | 0.901 | 4.540 | 69.528 | 3 | 2.932 | 19 | 19 | 9E9 | 9E9 | 2487.198 | 7.406 |
| 21.500 | 13.250 | 0.523 | 3.950 | 72.396 | 3 | 3.000 | 13 | 13 | 9E9 | 9E9 | 1598.312 | 4.100 |
| 22.500 | 23.900 | 0.808 | 3.382 | 62.389 | 5 | 2.764 | 11 | 10 | 9E9 | 9E9 | 3008.119 | 8.708 |
| 23.500 | 51.667 | 1.580 | 3.058 | 52.125 | 6 | 2.522 | 20 | 19 | 40 | 37 | 9E9 | 9E9 |
| 24.500 | 54.900 | 1.508 | 2.747 | 49.605 | 6 | 2.463 | 21 | 19 | 41 | 37 | 9E9 | 9E9 |
| 25.500 | 99.300 | 1.028 | 1.036 | 24.160 | 8 | 1.863 | 24 | 21 | 64 | 41 | 9E9 | 9E9 |
| 26.500 | 258.833 | 0.740 | 0.286 | 0.000 | 10 | 1.036 | 41 | 36 | 100 | 45 | 9E9 | 9E9 |
| 27.500 | 474.333 | 2.937 | 0.619 | 0.212 | 10 | 1.298 | 76 | 65 | 123 | 47 | 9E9 | 9E9 |
| 28.500 | 435.133 | 1.728 | 0.397 | 0.000 | 10 | 1.084 | 69 | 58 | 119 | 47 | 9E9 | 9E9 |
| 29.500 | 542.800 | 2.715 | 0.500 | 0.000 | 10 | 1.173 | 87 | 71 | 9E9 | 9E9 | 9E9 | 9E9 |
| 30.500 | 660.300 | 2.610 | 0.395 | 0.000 | 10 | 1.023 | 105 | 84 | 9E9 | 9E9 | 9E9 | 9E9 |




GROUP DELTA CONSULTANTS

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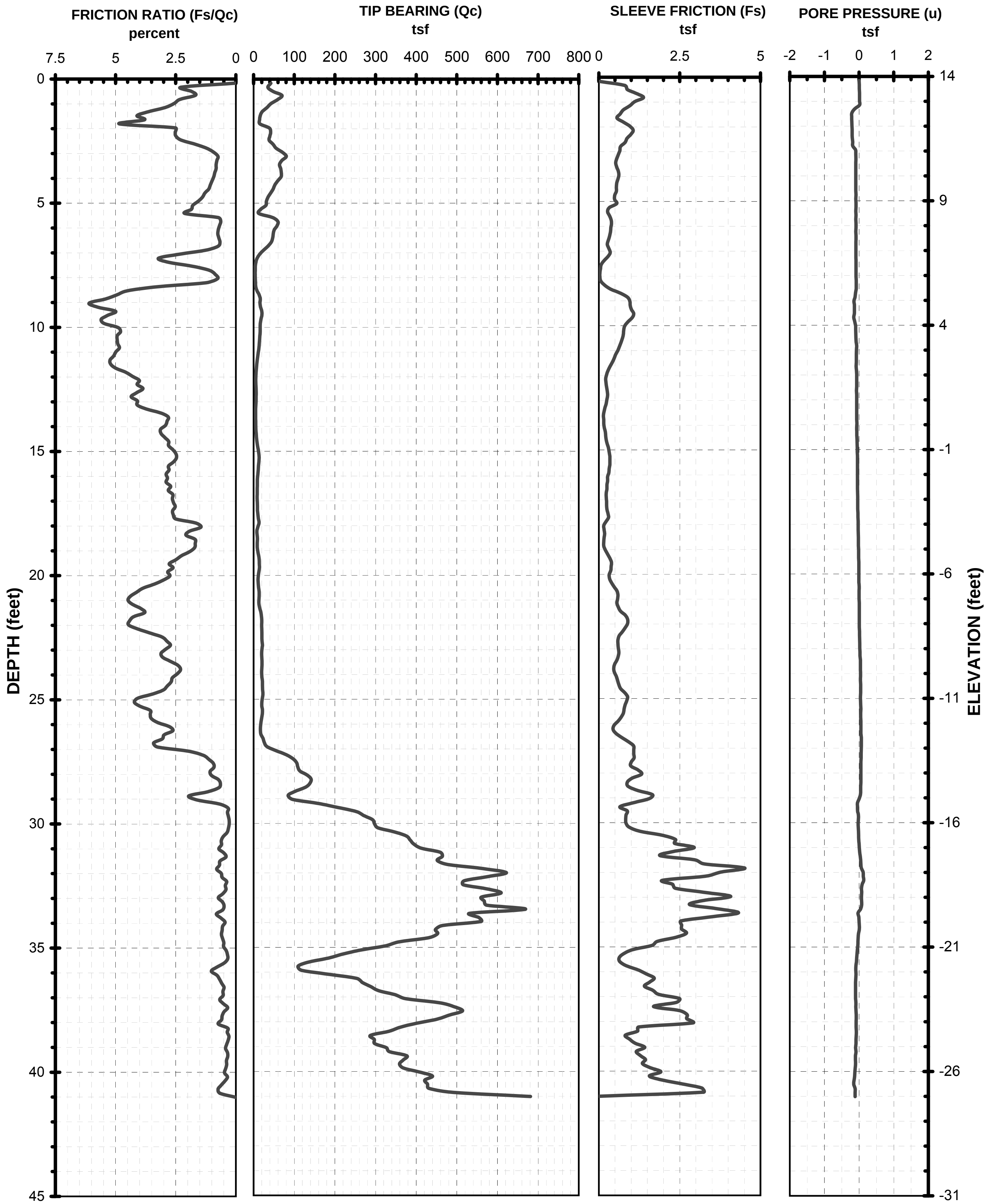
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-11 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 2-Mar-12 | A-18A |

```
"
"Output file from CPTINT - Version 5.2
"=====================================
"INPUT FILE: C:\CPTINT\C11.csv
"-----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           1.520
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C11.csv  |-----------------------------------------------------------------------------------
```

| " Depth " (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 28.133 | 0.607 | 2.156 | 27.223 | 6 | 1.935 | 11 | 17 | 93 | 50 | 9E9 | 9E9 |
| 1.500 | 22.117 | 0.873 | 3.949 | 45.377 | 4 | 2.363 | 14 | 21 | 9E9 | 9E9 | 2937.148 | 176.133 |
| 2.500 | 12.450 | 0.547 | 4.391 | 54.928 | 3 | 2.588 | 12 | 18 | 9E9 | 9E9 | 1639.584 | 44.879 |
| 3.500 | 10.050 | 0.462 | 4.594 | 60.676 | 3 | 2.724 | 10 | 15 | 9E9 | 9E9 | 1311.329 | 22.451 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 10.633 | 0.577 | 5.423 | 65.930 | 3 | 2.848 | 10 | 15 | 9E9 | 9E9 | 1385.401 | 17.635 |
| 5.500 | 8.950 | 0.403 | 4.507 | 65.483 | 3 | 2.837 | 9 | 14 | 9E9 | 9E9 | 1150.503 | 11.584 |
| 6.500 | 17.717 | 0.910 | 5.136 | 62.298 | 3 | 2.762 | 17 | 26 | 9E9 | 9E9 | 2309.302 | 24.773 |
| 7.500 | 14.500 | 0.795 | 5.483 | 66.413 | 3 | 2.859 | 14 | 21 | 9E9 | 9E9 | 1871.962 | 17.140 |
| 8.500 | 11.200 | 0.452 | 4.033 | 63.928 | 3 | 2.800 | 11 | 17 | 9E9 | 9E9 | 1421.286 | 11.018 |
| 9.500 | 8.133 | 0.267 | 3.279 | 64.894 | 3 | 2.823 | 8 | 12 | 9E9 | 9E9 | 999.673 | 6.505 |
| 10.500 | 6.500 | 0.224 | 3.451 | 69.850 | 3 | 2.940 | 6 | 9 | 9E9 | 9E9 | 772.882 | 4.362 |
| 11.500 | 6.533 | 0.220 | 3.367 | 70.219 | 3 | 2.949 | 6 | 9 | 9E9 | 9E9 | 768.053 | 4.021 |
| 12.500 | 9.483 | 0.295 | 3.111 | 64.392 | 4 | 2.811 | 6 | 9 | 9E9 | 9E9 | 1153.485 | 6.237 |
| 13.500 | 9.367 | 0.250 | 2.669 | 62.520 | 4 | 2.767 | 6 | 9 | 9E9 | 9E9 | 1129.921 | 5.692 |
| 14.500 | 7.333 | 0.162 | 2.205 | 63.564 | 4 | 2.792 | 5 | 7 | 9E9 | 9E9 | 850.736 | 3.750 |
| 15.500 | 18.667 | 0.413 | 2.214 | 51.222 | 5 | 2.501 | 9 | 13 | 9E9 | 9E9 | 2354.236 | 12.612 |
| 16.500 | 13.150 | 0.258 | 1.965 | 54.263 | 5 | 2.573 | 6 | 8 | 9E9 | 9E9 | 1608.262 | 7.400 |
| 17.500 | 13.000 | 0.328 | 2.526 | 59.662 | 5 | 2.700 | 6 | 8 | 9E9 | 9E9 | 1578.030 | 6.845 |
| 18.500 | 10.617 | 0.273 | 2.575 | 63.563 | 4 | 2.792 | 7 | 9 | 9E9 | 9E9 | 1254.389 | 4.877 |
| 19.500 | 10.533 | 0.387 | 3.671 | 70.794 | 3 | 2.962 | 10 | 13 | 9E9 | 9E9 | 1235.103 | 4.541 |
| 20.500 | 15.614 | 0.617 | 3.952 | 66.966 | 4 | 2.872 | 10 | 12 | 9E9 | 9E9 | 1917.587 | 7.485 |
| 21.500 | 31.450 | 1.055 | 3.355 | 56.020 | 5 | 2.614 | 15 | 18 | 9E9 | 9E9 | 4026.157 | 18.029 |
| 22.500 | 37.017 | 1.578 | 4.264 | 59.675 | 4 | 2.700 | 24 | 28 | 9E9 | 9E9 | 4755.788 | 21.157 |
| 23.500 | 25.617 | 1.123 | 4.385 | 64.554 | 4 | 2.815 | 16 | 18 | 9E9 | 9E9 | 3231.498 | 12.460 |
| 24.500 | 16.217 | 0.445 | 2.744 | 61.518 | 5 | 2.744 | 8 | 9 | 9E9 | 9E9 | 1962.998 | 6.401 |
| 25.500 | 16.883 | 0.358 | 2.122 | 56.719 | 5 | 2.630 | 8 | 9 | 9E9 | 9E9 | 2048.352 | 6.487 |
| 26.500 | 24.817 | 0.565 | 2.277 | 53.333 | 6 | 2.551 | 10 | 10 | 14 | 33 | 9E9 | 9E9 |
| 27.500 | 42.583 | 0.532 | 1.249 | 35.775 | 7 | 2.137 | 14 | 14 | 35 | 37 | 9E9 | 9E9 |
| 28.500 | 265.250 | 1.100 | 0.415 | 0.000 | 10 | 1.162 | 42 | 42 | 105 | 45 | 9E9 | 9E9 |
| 29.500 | 475.600 | 1.490 | 0.313 | 0.000 | 10 | 0.913 | 76 | 74 | 127 | 47 | 9E9 | 9E9 |





GROUP DELTA CONSULTANTS

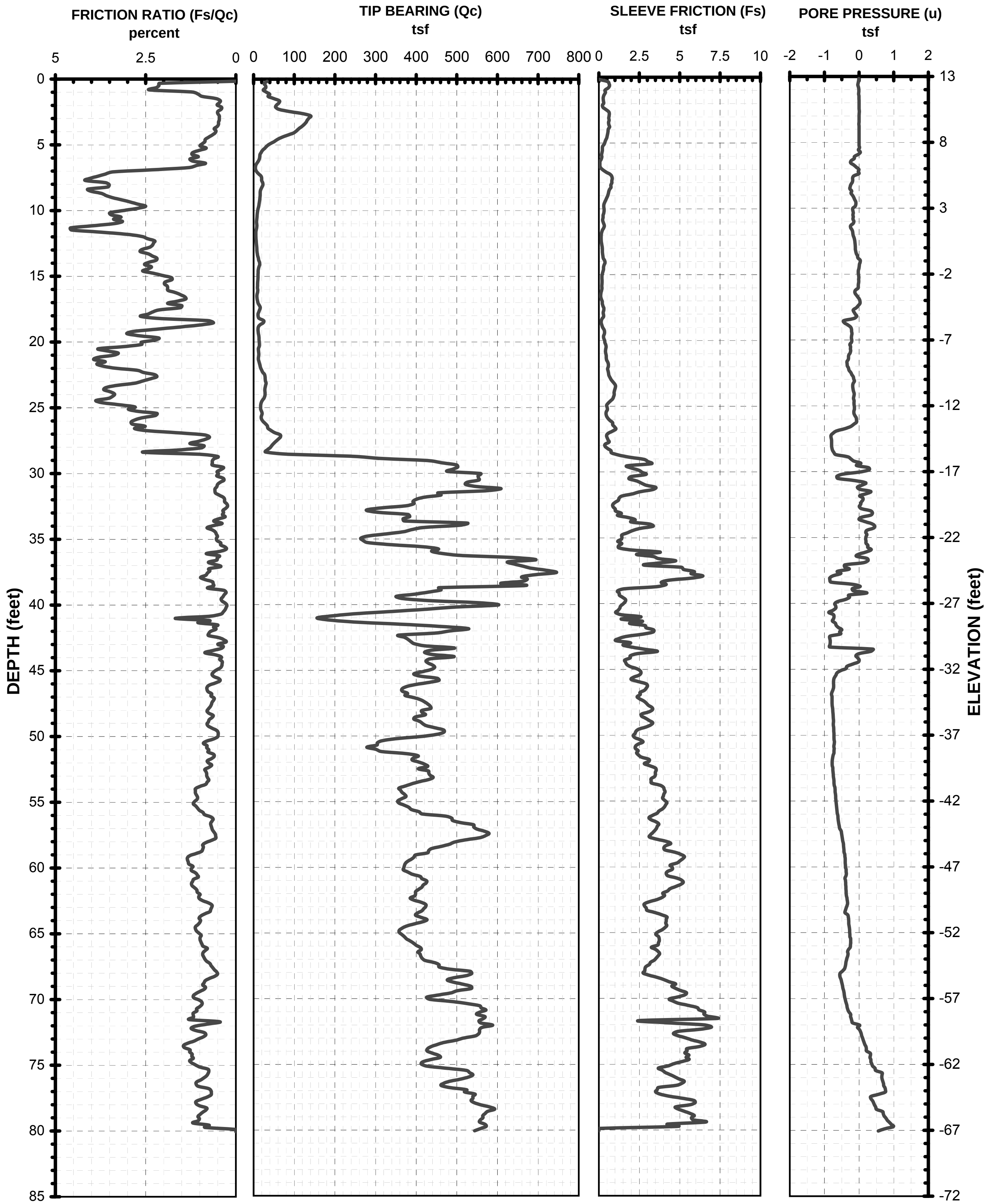
370 Amapola Avenue, Suite 212, Torrance, CA 90501
32 Mauchly, Suite B, Irvine, CA 92618
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126


| CONE PENETRATION TEST RECORD | HOLE ID |
|---|---|
| **PROJECT:** Marina Del Rey | CPT-12-12 |
| **CPT:** Kehoe Testing and Engineering | **FIGURE NO.** |
| **DATE:** 1-Mar-12 | A-19A |

```
"
"Output file from CPTINT - Version 5.2
"===================================
"INPUT FILE: C:\CPTINT\C12.csv
"------------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           4.570
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C12.csv  |--------------------------------------------------------------------------------
```

| Depth (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 49.633 | 0.890 | 1.793 | 23.320 | 7 | 1.843 | 16 | 24 | 116 | 50 | 9E9 | 9E9 |
| 1.500 | 23.033 | 0.777 | 3.372 | 41.343 | 5 | 2.268 | 11 | 17 | 9E9 | 9E9 | 3066.405 | 192.296 |
| 2.500 | 49.133 | 0.842 | 1.713 | 24.510 | 7 | 1.871 | 16 | 24 | 80 | 45 | 9E9 | 9E9 |
| 3.500 | 69.333 | 0.573 | 0.827 | 7.817 | 8 | 1.478 | 17 | 26 | 86 | 47 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 44.700 | 0.533 | 1.193 | 20.922 | 7 | 1.786 | 14 | 21 | 64 | 43 | 9E9 | 9E9 |
| 5.500 | 37.383 | 0.373 | 0.999 | 20.645 | 7 | 1.780 | 12 | 18 | 53 | 41 | 9E9 | 9E9 |
| 6.500 | 41.750 | 0.320 | 0.766 | 15.962 | 7 | 1.670 | 13 | 20 | 53 | 41 | 9E9 | 9E9 |
| 7.500 | 6.917 | 0.157 | 2.265 | 59.637 | 4 | 2.699 | 4 | 6 | 9E9 | 9E9 | 863.984 | 5.298 |
| 8.500 | 8.767 | 0.367 | 4.183 | 69.529 | 3 | 2.932 | 8 | 12 | 9E9 | 9E9 | 1100.488 | 6.141 |
| 9.500 | 17.983 | 0.992 | 5.514 | 68.225 | 3 | 2.902 | 17 | 26 | 9E9 | 9E9 | 2325.970 | 13.598 |
| 10.500 | 14.500 | 0.711 | 4.906 | 69.301 | 3 | 2.927 | 14 | 20 | 9E9 | 9E9 | 1852.431 | 8.995 |
| 11.500 | 7.600 | 0.377 | 4.956 | 78.504 | 3 | 3.144 | 7 | 9 | 9E9 | 9E9 | 922.432 | 3.356 |
| 12.500 | 5.883 | 0.242 | 4.108 | 79.817 | 3 | 3.175 | 6 | 7 | 9E9 | 9E9 | 685.480 | 2.089 |
| 13.500 | 5.183 | 0.170 | 3.280 | 78.978 | 3 | 3.155 | 5 | 6 | 9E9 | 9E9 | 581.895 | 1.548 |
| 14.500 | 8.017 | 0.228 | 2.848 | 70.987 | 4 | 2.967 | 5 | 6 | 9E9 | 9E9 | 951.768 | 2.621 |
| 15.500 | 12.267 | 0.328 | 2.677 | 64.603 | 5 | 2.816 | 6 | 6 | 9E9 | 9E9 | 1510.578 | 4.392 |
| 16.500 | 9.083 | 0.250 | 2.752 | 69.860 | 4 | 2.940 | 6 | 6 | 9E9 | 9E9 | 1078.019 | 2.773 |
| 17.500 | 10.700 | 0.255 | 2.383 | 65.466 | 5 | 2.837 | 5 | 5 | 9E9 | 9E9 | 1285.626 | 3.329 |
| 18.500 | 9.167 | 0.158 | 1.727 | 62.926 | 5 | 2.777 | 4 | 4 | 9E9 | 9E9 | 1073.125 | 2.562 |
| 19.500 | 13.000 | 0.325 | 2.500 | 64.438 | 5 | 2.812 | 6 | 6 | 9E9 | 9E9 | 1576.365 | 4.000 |
| 20.500 | 12.357 | 0.463 | 3.746 | 72.874 | 3 | 3.011 | 12 | 11 | 9E9 | 9E9 | 1482.456 | 3.575 |
| 21.500 | 17.517 | 0.738 | 4.215 | 70.866 | 3 | 2.964 | 17 | 16 | 9E9 | 9E9 | 2162.233 | 5.527 |
| 22.500 | 20.667 | 0.660 | 3.194 | 63.887 | 5 | 2.799 | 10 | 9 | 9E9 | 9E9 | 2574.170 | 6.646 |
| 23.500 | 20.183 | 0.535 | 2.651 | 61.102 | 5 | 2.734 | 10 | 9 | 9E9 | 9E9 | 2501.705 | 6.215 |
| 24.500 | 21.767 | 0.683 | 3.139 | 63.613 | 5 | 2.793 | 10 | 9 | 9E9 | 9E9 | 2704.699 | 6.636 |
| 25.500 | 20.317 | 0.748 | 3.683 | 67.854 | 4 | 2.893 | 13 | 11 | 9E9 | 9E9 | 2498.698 | 5.826 |
| 26.500 | 22.400 | 0.688 | 3.073 | 63.529 | 5 | 2.791 | 11 | 9 | 9E9 | 9E9 | 2770.599 | 6.430 |
| 27.500 | 93.250 | 1.077 | 1.155 | 28.136 | 8 | 1.957 | 22 | 18 | 59 | 39 | 9E9 | 9E9 |
| 28.500 | 121.283 | 1.167 | 0.962 | 21.954 | 8 | 1.811 | 29 | 24 | 69 | 41 | 9E9 | 9E9 |
| 29.500 | 213.150 | 0.970 | 0.455 | 1.475 | 9 | 1.328 | 41 | 33 | 90 | 43 | 9E9 | 9E9 |
| 30.500 | 350.867 | 1.628 | 0.464 | 0.000 | 10 | 1.223 | 56 | 44 | 109 | 45 | 9E9 | 9E9 |
| 31.500 | 493.114 | 3.091 | 0.627 | 1.135 | 10 | 1.320 | 79 | 61 | 122 | 47 | 9E9 | 9E9 |
| 32.500 | 558.933 | 2.880 | 0.515 | 0.000 | 10 | 1.201 | 89 | 67 | 9E9 | 9E9 | 9E9 | 9E9 |
| 33.500 | 575.717 | 3.332 | 0.579 | 0.000 | 10 | 1.262 | 92 | 68 | 9E9 | 9E9 | 9E9 | 9E9 |
| 34.500 | 413.050 | 2.278 | 0.552 | 0.113 | 10 | 1.296 | 66 | 48 | 113 | 45 | 9E9 | 9E9 |
| 35.500 | 172.183 | 0.862 | 0.500 | 7.393 | 9 | 1.468 | 33 | 24 | 79 | 41 | 9E9 | 9E9 |
| 36.500 | 274.983 | 1.613 | 0.587 | 5.477 | 9 | 1.422 | 53 | 37 | 96 | 43 | 9E9 | 9E9 |
| 37.500 | 462.317 | 2.420 | 0.523 | 0.000 | 10 | 1.260 | 74 | 51 | 116 | 45 | 9E9 | 9E9 |
| 38.500 | 329.550 | 1.372 | 0.416 | 0.000 | 10 | 1.227 | 53 | 36 | 103 | 45 | 9E9 | 9E9 |
| 39.500 | 355.450 | 1.373 | 0.386 | 0.000 | 10 | 1.178 | 57 | 38 | 105 | 45 | 9E9 | 9E9 |
| 40.500 | 436.567 | 2.407 | 0.551 | 0.665 | 10 | 1.309 | 70 | 46 | 113 | 45 | 9E9 | 9E9 |
| 41.499 | 681.300 | 0.000 | 0.000 | 9E9 | 10 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 |

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4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

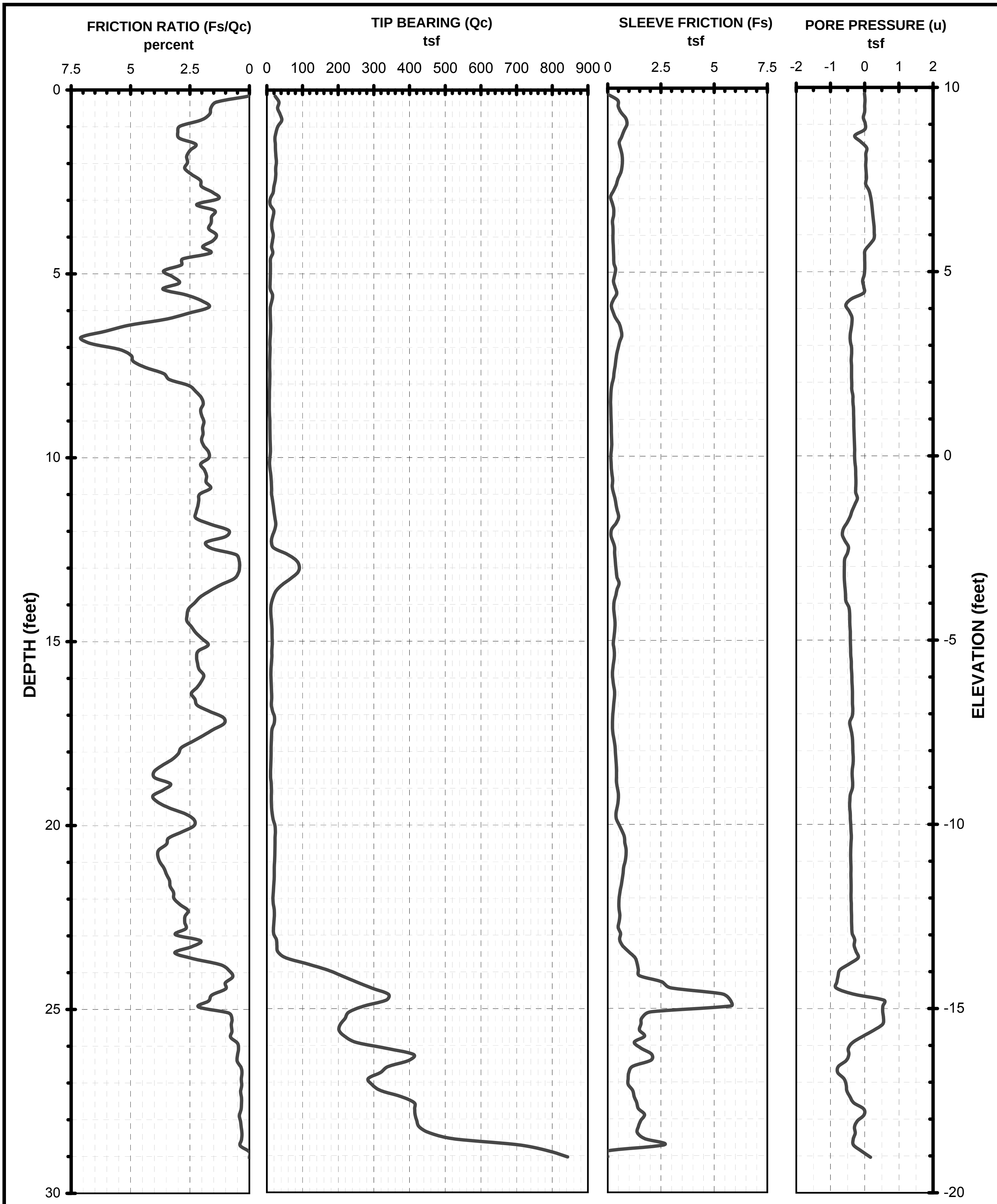
| CONE PENETRATION TEST RECORD | | HOLE ID |
|---|---|---|
| PROJECT: | Marina Del Rey | CPT-12-13 |
| CPT: | Kehoe Testing and Engineering | FIGURE NO. |
| DATE: | 1-Mar-12 | A-20A |

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C13.csv
"-----------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           3.990
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-----------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C13.csv  |---------------------------------------------------------------------------------
```

| " Depth " (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 28.950 | 0.465 | 1.606 | 20.157 | 6 | 1.768 | 11 | 17 | 94 | 50 | 9E9 | 9E9 |
| 1.500 | 51.267 | 0.313 | 0.611 | 0.000 | 8 | 1.251 | 12 | 18 | 92 | 50 | 9E9 | 9E9 |
| 2.500 | 100.750 | 0.468 | 0.465 | 0.000 | 9 | 1.085 | 19 | 29 | 108 | 50 | 9E9 | 9E9 |
| 3.500 | 120.300 | 0.618 | 0.514 | 0.000 | 9 | 1.155 | 23 | 35 | 107 | 50 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 66.717 | 0.490 | 0.734 | 7.406 | 8 | 1.468 | 16 | 24 | 79 | 45 | 9E9 | 9E9 |
| 5.500 | 22.083 | 0.225 | 1.019 | 27.070 | 6 | 1.931 | 8 | 12 | 32 | 39 | 9E9 | 9E9 |
| 6.500 | 8.150 | 0.103 | 1.268 | 45.647 | 5 | 2.369 | 4 | 6 | 9E9 | 9E9 | 1037.357 | 7.700 |
| 7.500 | 16.800 | 0.642 | 3.819 | 59.257 | 4 | 2.690 | 11 | 17 | 9E9 | 9E9 | 2178.541 | 16.380 |
| 8.500 | 18.450 | 0.690 | 3.740 | 59.053 | 4 | 2.685 | 12 | 18 | 9E9 | 9E9 | 2392.817 | 15.826 |
| 9.500 | 13.650 | 0.402 | 2.943 | 59.002 | 5 | 2.684 | 7 | 11 | 9E9 | 9E9 | 1746.869 | 9.329 |
| 10.500 | 8.400 | 0.279 | 3.316 | 68.512 | 3 | 2.908 | 8 | 11 | 9E9 | 9E9 | 1036.143 | 4.298 |
| 11.500 | 6.433 | 0.245 | 3.808 | 75.821 | 3 | 3.081 | 6 | 8 | 9E9 | 9E9 | 770.611 | 2.656 |
| 12.500 | 6.983 | 0.167 | 2.387 | 67.778 | 4 | 2.891 | 4 | 5 | 9E9 | 9E9 | 833.737 | 2.646 |
| 13.500 | 11.100 | 0.260 | 2.342 | 61.815 | 5 | 2.751 | 5 | 6 | 9E9 | 9E9 | 1374.765 | 4.588 |
| 14.500 | 12.317 | 0.292 | 2.368 | 61.162 | 5 | 2.735 | 6 | 7 | 9E9 | 9E9 | 1526.802 | 5.008 |
| 15.500 | 10.133 | 0.192 | 1.891 | 60.571 | 5 | 2.721 | 5 | 6 | 9E9 | 9E9 | 1225.389 | 3.648 |
| 16.500 | 9.133 | 0.145 | 1.588 | 59.732 | 5 | 2.701 | 4 | 4 | 9E9 | 9E9 | 1084.017 | 3.005 |
| 17.500 | 13.400 | 0.258 | 1.928 | 57.816 | 5 | 2.656 | 6 | 6 | 9E9 | 9E9 | 1645.050 | 4.865 |
| 18.500 | 16.750 | 0.210 | 1.254 | 47.666 | 6 | 2.417 | 6 | 6 | 0 | 31 | 9E9 | 9E9 |
| 19.500 | 12.200 | 0.307 | 2.514 | 64.567 | 5 | 2.815 | 6 | 6 | 9E9 | 9E9 | 1473.445 | 3.932 |
| 20.500 | 12.971 | 0.410 | 3.161 | 68.251 | 4 | 2.902 | 8 | 8 | 9E9 | 9E9 | 1571.500 | 4.111 |
| 21.500 | 14.033 | 0.520 | 3.705 | 70.465 | 4 | 2.954 | 9 | 9 | 9E9 | 9E9 | 1701.945 | 4.386 |
| 22.500 | 25.750 | 0.627 | 2.434 | 55.300 | 6 | 2.597 | 10 | 9 | 13 | 33 | 9E9 | 9E9 |
| 23.500 | 28.733 | 0.963 | 3.353 | 60.496 | 5 | 2.719 | 14 | 13 | 9E9 | 9E9 | 3643.722 | 10.574 |
| 24.500 | 21.550 | 0.745 | 3.457 | 64.934 | 5 | 2.824 | 10 | 9 | 9E9 | 9E9 | 2681.801 | 6.961 |
| 25.500 | 19.350 | 0.497 | 2.567 | 61.168 | 5 | 2.735 | 9 | 8 | 9E9 | 9E9 | 2373.551 | 5.784 |
| 26.500 | 36.033 | 0.875 | 2.428 | 52.547 | 6 | 2.532 | 14 | 12 | 24 | 35 | 9E9 | 9E9 |
| 27.500 | 56.900 | 0.523 | 0.920 | 29.156 | 8 | 1.981 | 14 | 12 | 41 | 37 | 9E9 | 9E9 |
| 28.500 | 123.217 | 0.928 | 0.753 | 16.514 | 9 | 1.683 | 24 | 20 | 70 | 41 | 9E9 | 9E9 |
| 29.500 | 476.617 | 2.545 | 0.534 | 0.000 | 10 | 1.227 | 76 | 62 | 122 | 47 | 9E9 | 9E9 |
| 30.500 | 544.300 | 2.400 | 0.441 | 0.000 | 10 | 1.109 | 87 | 70 | 9E9 | 9E9 | 9E9 | 9E9 |
| 31.500 | 495.043 | 2.441 | 0.493 | 0.000 | 10 | 1.187 | 79 | 62 | 122 | 47 | 9E9 | 9E9 |
| 32.500 | 342.783 | 0.997 | 0.291 | 0.000 | 10 | 1.010 | 55 | 43 | 108 | 45 | 9E9 | 9E9 |
| 33.500 | 422.533 | 1.965 | 0.465 | 0.000 | 10 | 1.194 | 67 | 51 | 115 | 45 | 9E9 | 9E9 |
| 34.500 | 342.050 | 2.107 | 0.616 | 3.770 | 10 | 1.382 | 55 | 41 | 107 | 45 | 9E9 | 9E9 |
| 35.500 | 366.267 | 1.410 | 0.385 | 0.000 | 10 | 1.142 | 58 | 43 | 109 | 45 | 9E9 | 9E9 |
| 36.500 | 596.017 | 3.613 | 0.606 | 0.000 | 10 | 1.286 | 95 | 69 | 9E9 | 9E9 | 9E9 | 9E9 |
| 37.500 | 694.000 | 5.195 | 0.749 | 3.843 | 10 | 1.384 | 111 | 79 | 9E9 | 9E9 | 9E9 | 9E9 |
| 38.500 | 588.150 | 3.872 | 0.658 | 1.907 | 10 | 1.338 | 94 | 66 | 9E9 | 9E9 | 9E9 | 9E9 |
| 39.500 | 422.483 | 1.405 | 0.333 | 0.000 | 10 | 1.059 | 67 | 46 | 112 | 45 | 9E9 | 9E9 |
| 40.500 | 384.950 | 1.293 | 0.336 | 0.000 | 10 | 1.091 | 61 | 41 | 108 | 45 | 9E9 | 9E9 |
| 41.499 | 349.957 | 2.536 | 0.725 | 8.307 | 10 | 1.489 | 56 | 37 | 104 | 45 | 9E9 | 9E9 |
| 42.499 | 389.300 | 2.012 | 0.517 | 0.418 | 10 | 1.303 | 62 | 41 | 108 | 45 | 9E9 | 9E9 |
| 43.499 | 451.333 | 2.390 | 0.530 | 0.000 | 10 | 1.288 | 72 | 46 | 113 | 45 | 9E9 | 9E9 |
| 44.499 | 435.117 | 1.865 | 0.429 | 0.000 | 10 | 1.196 | 69 | 44 | 111 | 45 | 9E9 | 9E9 |
| 45.499 | 425.650 | 2.373 | 0.558 | 1.722 | 10 | 1.334 | 68 | 43 | 110 | 45 | 9E9 | 9E9 |
| 46.499 | 375.283 | 2.798 | 0.746 | 9.137 | 10 | 1.509 | 60 | 37 | 105 | 45 | 9E9 | 9E9 |
| 47.499 | 421.017 | 2.830 | 0.672 | 6.096 | 10 | 1.437 | 67 | 41 | 109 | 45 | 9E9 | 9E9 |
| 48.499 | 408.483 | 2.953 | 0.723 | 8.060 | 10 | 1.483 | 65 | 39 | 107 | 45 | 9E9 | 9E9 |
| 49.499 | 445.617 | 2.748 | 0.617 | 4.080 | 10 | 1.389 | 71 | 42 | 110 | 45 | 9E9 | 9E9 |
| 50.499 | 328.550 | 2.393 | 0.728 | 10.501 | 10 | 1.541 | 52 | 30 | 98 | 43 | 9E9 | 9E9 |
| 51.499 | 363.183 | 2.535 | 0.698 | 8.829 | 10 | 1.501 | 58 | 34 | 102 | 43 | 9E9 | 9E9 |
| 52.499 | 422.443 | 3.299 | 0.781 | 9.995 | 10 | 1.529 | 67 | 38 | 107 | 45 | 9E9 | 9E9 |
| 53.499 | 399.950 | 3.493 | 0.873 | 12.988 | 9 | 1.599 | 77 | 43 | 105 | 43 | 9E9 | 9E9 |
| 54.499 | 365.117 | 4.028 | 1.103 | 18.887 | 9 | 1.739 | 70 | 39 | 101 | 43 | 9E9 | 9E9 |
| 55.499 | 387.100 | 3.942 | 1.018 | 16.800 | 9 | 1.689 | 74 | 41 | 103 | 43 | 9E9 | 9E9 |
| 56.499 | 506.817 | 3.418 | 0.674 | 5.840 | 10 | 1.431 | 81 | 44 | 113 | 45 | 9E9 | 9E9 |
| 57.499 | 557.467 | 3.375 | 0.605 | 2.859 | 10 | 1.361 | 89 | 48 | 9E9 | 9E9 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58.499 | 456.067 | 4.260 | 0.934 | 13.968 | 9 | 1.623 | 87 | 46 | 108 | 45 | 9E9 | 9E9 |
| 59.499 | 383.917 | 4.970 | 1.295 | 22.535 | 9 | 1.825 | 74 | 39 | 101 | 43 | 9E9 | 9E9 |
| 60.499 | 388.700 | 4.428 | 1.139 | 19.788 | 9 | 1.760 | 74 | 39 | 101 | 43 | 9E9 | 9E9 |
| 61.499 | 414.283 | 4.793 | 1.157 | 19.708 | 9 | 1.758 | 79 | 41 | 104 | 43 | 9E9 | 9E9 |
| 62.499 | 404.871 | 3.467 | 0.856 | 13.598 | 10 | 1.614 | 65 | 33 | 102 | 43 | 9E9 | 9E9 |
| 63.499 | 412.000 | 3.610 | 0.876 | 14.047 | 9 | 1.624 | 79 | 40 | 103 | 43 | 9E9 | 9E9 |
| 64.499 | 378.267 | 4.025 | 1.064 | 19.026 | 9 | 1.742 | 72 | 36 | 99 | 43 | 9E9 | 9E9 |
| 65.499 | 382.017 | 3.667 | 0.960 | 16.878 | 9 | 1.691 | 73 | 37 | 99 | 43 | 9E9 | 9E9 |
| 66.499 | 410.350 | 3.568 | 0.870 | 14.269 | 9 | 1.630 | 79 | 40 | 102 | 43 | 9E9 | 9E9 |
| 67.499 | 465.733 | 3.060 | 0.657 | 7.372 | 10 | 1.467 | 74 | 37 | 107 | 43 | 9E9 | 9E9 |
| 68.499 | 505.817 | 3.763 | 0.744 | 9.341 | 10 | 1.513 | 81 | 41 | 109 | 43 | 9E9 | 9E9 |
| 69.499 | 489.550 | 4.990 | 1.019 | 16.460 | 9 | 1.681 | 94 | 47 | 108 | 43 | 9E9 | 9E9 |
| 70.499 | 522.567 | 5.288 | 1.012 | 15.876 | 9 | 1.668 | 100 | 50 | 9E9 | 9E9 | 9E9 | 9E9 |
| 71.499 | 558.617 | 5.635 | 1.009 | 15.377 | 9 | 1.656 | 107 | 54 | 9E9 | 9E9 | 9E9 | 9E9 |
| 72.499 | 554.057 | 5.651 | 1.020 | 15.777 | 9 | 1.665 | 106 | 53 | 9E9 | 9E9 | 9E9 | 9E9 |
| 73.499 | 451.583 | 5.958 | 1.319 | 23.089 | 9 | 1.838 | 87 | 44 | 104 | 43 | 9E9 | 9E9 |
| 74.499 | 436.300 | 5.272 | 1.208 | 21.574 | 9 | 1.802 | 84 | 42 | 102 | 43 | 9E9 | 9E9 |
| 75.499 | 504.567 | 4.177 | 0.828 | 12.368 | 10 | 1.585 | 81 | 41 | 108 | 43 | 9E9 | 9E9 |
| 76.499 | 488.267 | 4.577 | 0.937 | 15.395 | 9 | 1.656 | 94 | 47 | 106 | 43 | 9E9 | 9E9 |
| 77.499 | 536.883 | 4.765 | 0.888 | 13.508 | 10 | 1.612 | 86 | 43 | 9E9 | 9E9 | 9E9 | 9E9 |
| 78.499 | 574.017 | 5.352 | 0.932 | 14.107 | 10 | 1.626 | 92 | 46 | 9E9 | 9E9 | 9E9 | 9E9 |
| 79.499 | 563.133 | 4.550 | 0.808 | 11.303 | 10 | 1.560 | 90 | 45 | 9E9 | 9E9 | 9E9 | 9E9 |
| 80.499 | 543.900 | 0.000 | 0.000 | 9E9 | 10 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 |




GROUP DELTA CONSULTANTS

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32 Mauchly, Suite B, Irvine, CA 92618
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

**CONE PENETRATION TEST RECORD**

**PROJECT:** Marina Del Rey
**CPT:** Kehoe Testing and Engineering
**DATE:** 23-Feb-12

**HOLE ID** CPT-12-14

**FIGURE NO.** A-21A

```
"
"Output file from CPTINT - Version 5.2
"====================================
"INPUT FILE: C:\CPTINT\C14.csv
"------------------------------
"
"Developed by: UBC In-Situ Testing FREEWARE
"     Program: Piezocone Interpretation
"    Web Site: www.civil.ubc.ca/home/in-situ
"
"Interpreter Name: YL
"
"
"SUMMARY SHEET
"-------------
"'a' for calculating Qt:                 0.830
"Value for Water Table (in m):           2.290
"Valid Zone Classification based on:     Rf
"Missing unit weight to start depth:     18.860
"Method for calculating Su:              Nk
"Value of the constant Nk:               15.000
"Method used to calculate OCR:           Su/EOS
"(Su/EOS) for normal consolidation:      0.250
"Define Zone 6 for Sand Parameters?      YES
"Sand Compressibility for calc Dr:       Moderate
"Method for Friction Angle:              Robertson & Campanella
"Vertical Flow Gradient, i (- up):       +0.000
"CPT to SPT N60 Conversion:              Robertson & Campanella
"
"Soil Behavior Type Zone Numbers
"For Rf Zone & Bq Zone Classification
"-------------------------------------
"Zone #1=Sensitive fine grained     Zone #7 =Sand with some Silt
"Zone #2=Organic material           Zone #8 =Fine sand
"Zone #3=Clay                       Zone #9 =Sand
"Zone #4=Silty clay                 Zone #10=Gravelly sand
"Zone #5=Clayey silt                Zone #11=Very stiff fine grained *
"Zone #6=Silty sand                 Zone #12=Sand to clayey sand *
"   * Overconsolidated and/or cemented
"
"NOTE:
"-----
"For soil classification, Rf values > 8 are assumed to be 8.
"
"( Note: 9E9 means Out Of Range )
"
"---|  INPUT FILE: C:\CPTINT\C14.csv  |-------------------------------------------------------------------------------------
```

| " Depth " (feet) | Qt(avg) (TSF) | Fs(avg) (TSF) | Rf (%) | FC (%) | Rf Zone (zone #) | Ic index | Spt N (blow/ft) | Spt N1 (blow/ft) | Dr (%) | Phi (degree) | Su (psf) | OCR (ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.500 | 32.900 | 0.555 | 1.687 | 21.321 | 6 | 1.796 | 13 | 20 | 99 | 50 | 9E9 | 9E9 |
| 1.500 | 24.733 | 0.655 | 2.648 | 35.572 | 5 | 2.132 | 12 | 18 | 9E9 | 9E9 | 3288.350 | 202.842 |
| 2.500 | 20.133 | 0.427 | 2.119 | 35.200 | 6 | 2.123 | 8 | 12 | 45 | 43 | 9E9 | 9E9 |
| 3.500 | 15.350 | 0.247 | 1.607 | 34.963 | 6 | 2.118 | 6 | 9 | 28 | 39 | 9E9 | 9E9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.500 | 12.667 | 0.285 | 2.250 | 46.197 | 5 | 2.382 | 6 | 9 | 9E9 | 9E9 | 1650.417 | 22.325 |
| 5.500 | 11.367 | 0.300 | 2.639 | 52.479 | 4 | 2.530 | 7 | 11 | 9E9 | 9E9 | 1475.703 | 15.167 |
| 6.500 | 9.667 | 0.497 | 5.138 | 69.029 | 3 | 2.921 | 9 | 14 | 9E9 | 9E9 | 1247.641 | 10.008 |
| 7.500 | 8.233 | 0.368 | 4.474 | 69.695 | 3 | 2.936 | 8 | 12 | 9E9 | 9E9 | 1048.477 | 6.748 |
| 8.500 | 7.200 | 0.153 | 2.130 | 58.506 | 4 | 2.673 | 5 | 8 | 9E9 | 9E9 | 902.659 | 5.177 |
| 9.500 | 9.100 | 0.173 | 1.905 | 54.357 | 5 | 2.575 | 4 | 6 | 9E9 | 9E9 | 1141.386 | 6.459 |
| 10.500 | 10.729 | 0.197 | 1.838 | 52.383 | 5 | 2.528 | 5 | 8 | 9E9 | 9E9 | 1351.851 | 7.454 |
| 11.500 | 20.517 | 0.380 | 1.852 | 45.063 | 6 | 2.356 | 8 | 12 | 18 | 37 | 9E9 | 9E9 |
| 12.500 | 46.233 | 0.290 | 0.627 | 15.857 | 7 | 1.667 | 15 | 22 | 48 | 39 | 9E9 | 9E9 |
| 13.500 | 42.833 | 0.413 | 0.965 | 25.280 | 7 | 1.889 | 14 | 20 | 44 | 39 | 9E9 | 9E9 |
| 14.500 | 13.083 | 0.310 | 2.369 | 56.970 | 5 | 2.636 | 6 | 8 | 9E9 | 9E9 | 1637.060 | 7.441 |
| 15.500 | 13.067 | 0.268 | 2.054 | 55.017 | 5 | 2.590 | 6 | 8 | 9E9 | 9E9 | 1629.057 | 7.010 |
| 16.500 | 13.167 | 0.282 | 2.139 | 56.276 | 5 | 2.620 | 6 | 8 | 9E9 | 9E9 | 1634.389 | 6.686 |
| 17.500 | 15.633 | 0.260 | 1.663 | 50.036 | 6 | 2.473 | 6 | 8 | 2 | 33 | 9E9 | 9E9 |
| 18.500 | 11.217 | 0.395 | 3.522 | 68.679 | 4 | 2.912 | 7 | 9 | 9E9 | 9E9 | 1353.868 | 4.796 |
| 19.500 | 13.817 | 0.448 | 3.245 | 64.888 | 4 | 2.823 | 9 | 11 | 9E9 | 9E9 | 1699.289 | 6.086 |
| 20.500 | 22.643 | 0.760 | 3.356 | 60.003 | 5 | 2.708 | 11 | 13 | 9E9 | 9E9 | 2866.344 | 11.173 |
| 21.500 | 19.333 | 0.652 | 3.371 | 62.396 | 5 | 2.764 | 9 | 10 | 9E9 | 9E9 | 2416.470 | 8.634 |
| 22.500 | 19.517 | 0.542 | 2.775 | 59.011 | 5 | 2.684 | 9 | 10 | 9E9 | 9E9 | 2432.917 | 8.357 |
| 23.500 | 71.133 | 1.055 | 1.483 | 32.446 | 7 | 2.058 | 23 | 25 | 56 | 39 | 9E9 | 9E9 |
| 24.500 | 284.050 | 3.983 | 1.402 | 20.344 | 9 | 1.773 | 54 | 56 | 109 | 45 | 9E9 | 9E9 |
| 25.500 | 221.167 | 1.605 | 0.726 | 7.612 | 9 | 1.473 | 42 | 43 | 98 | 45 | 9E9 | 9E9 |
| 26.500 | 347.783 | 1.462 | 0.420 | 0.000 | 10 | 1.114 | 56 | 55 | 115 | 47 | 9E9 | 9E9 |
| 27.500 | 372.133 | 1.317 | 0.354 | 0.000 | 10 | 1.020 | 59 | 57 | 117 | 47 | 9E9 | 9E9 |
| 28.500 | 553.417 | 1.463 | 0.264 | 0.000 | 10 | 0.805 | 88 | 83 | 9E9 | 9E9 | 9E9 | 9E9 |
| 29.500 | 843.200 | 0.000 | 0.000 | 9E9 | 10 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 | 9E9 |

# APPENDIX B
# LABORATORY TESTS

GROUP DELTA CONSULTANTS

## APPENDIX B
## LABORATORY TESTING

### B.1 General

Laboratory testing was performed to aid in the classification of soils encountered in the borings and to evaluate their physical properties and engineering characteristics. A description of the laboratory testing program is provided below. The laboratory testing is supplemented by the results of Standard Penetration Test (SPT) sampling conducted in the borings and the results of the CPT probes, which provide additional means to evaluate in situ soil properties such as density, shear strength and compressibility.

### B.2 Soil Classification

The subsurface materials were classified visually in the field using the Unified Soil Classification System (USCS), in accordance with ASTM Test Methods D-2487 and D 2488. Soil classifications were modified as necessary based on further inspection and testing in the laboratory. The soil classifications are presented on the key for soil classification and on the boring logs in Appendix A.

### B.3 Moisture Content and Dry Unit Weight

The in-situ moisture content of selected bulk, SPT, and Ring samples was determined by oven drying in general accordance with ASTM D 2216. Selected California Ring samples were trimmed flush in the metal rings and wet weight was measured. After drying, the dry weight of each sample was measured, volume and weight of the metal rings was measured, and moisture content and dry density were calculated in general accordance with ASTM D 2216 and D 2937. Results of these tests are presented on the boring logs in Appendix A and Table B-1.

### B.4 Grain Size Distribution and Percent Passing No. 200 Sieve:

Representative samples were dried, weighed, soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. The percentage of fines (soil passing No. 200 sieve) was determined in accordance with ASTM D 1140. The washed material retained on No. 200 sieve was shaken through a standard stack of sieves in accordance with ASTM D 422 to determine the grain size distribution. The relative proportion (or percentage) by dry weight of gravel (retained on No. 4 sieve), sand (passing No. 4 and retained on No. 200 sieve), and fines (passing No. 200 sieve) are summarized in Table B-1.

## B.5 Atterberg Limits

Soil plasticity was evaluated by measuring the Atterberg limits. This test includes Liquid Limit (LL) and Plastic Limit (PL) tests to determine the Plasticity Index (PI) in accordance with ASTM D4318. Results of these tests are illustrated in the plasticity charts shown in Figure B-1 and summarized in Table B-1.

## B.6 Consolidation

The consolidation characteristics of the foundation soils were determined by performing one-dimensional consolidation in general accordance with ASTM D2435, using a floating ring consolidometer and dead weight system. Results of these tests are presented in Figures B-2 through B-5.

## B.7 Pocket Penetrometer

Undrained shear strengths ($S_u$) of cohesive samples were measured using a pocket penetrometer. The measured $S_u$ values (in ksf) are presented in Table B-1 and the boring logs of Appendix A.

## B.8 Miniature Vane Shear

Shear strength of selected cohesive samples was estimated in the laboratory in general accordance with ASTM D 4648 using a Geonor™ Inspection Vane Tester H-60 Miniature Vane Shear device with a 16 x 32 mm vane having an area ratio of 14%, respectively. The test consists of inserting the miniature shear vane into the soil sample, rotating the vane at a constant rate until the cylindrical surface surrounding the vane fails in shear, measuring the maximum torque exerted on the vane during testing, and calculating the unit shearing resistance on the cylindrical surface. Undrained shear strengths measured in the test are summarized in Table B-1.

## B.9 Direct Shear

To determine the drained shear strength parameters of the on-site soils, direct shear tests were performed on selected in situ samples in accordance with ASTM D 3080. After the initial weight and volume measurements were made, the sample was placed in the shear machine, and a selected normal load was applied. The sample was saturated or kept at field moisture (to model worst case field conditions), allowed to consolidate under the selected normal load, and then sheared to failure. Shear rate was selected to maintain drained conditions. Shear stress and vertical/horizontal sample deformations were monitored throughout the test. The process was repeated on additional samples of the same soil material at two additional normal loads. The test results are presented in Figures B-6 through B-8.

### B.10 Soil Expansion Index

A representative grab sample of existing soil was collected from the site and tested to determine the expansion index. Testing was performed according to ASTM D4829. The results of these tests are presented in Table B-1.

### B.11 Soil Corrosivity

Tests were performed in order to determine corrosion potential of site soils on concrete and ferrous metals. Corrosivity testing included minimum electrical resistivity and soil pH (Caltrans method 643), water-soluble chlorides (Orion 170A+ Ion Probe), and water-soluble sulfates (ASTM D 516). The test results are summarized in Table B-1.

The following tables and figures are attached and complete this appendix:

**LIST OF TABLES**



**LIST OF FIGURES**

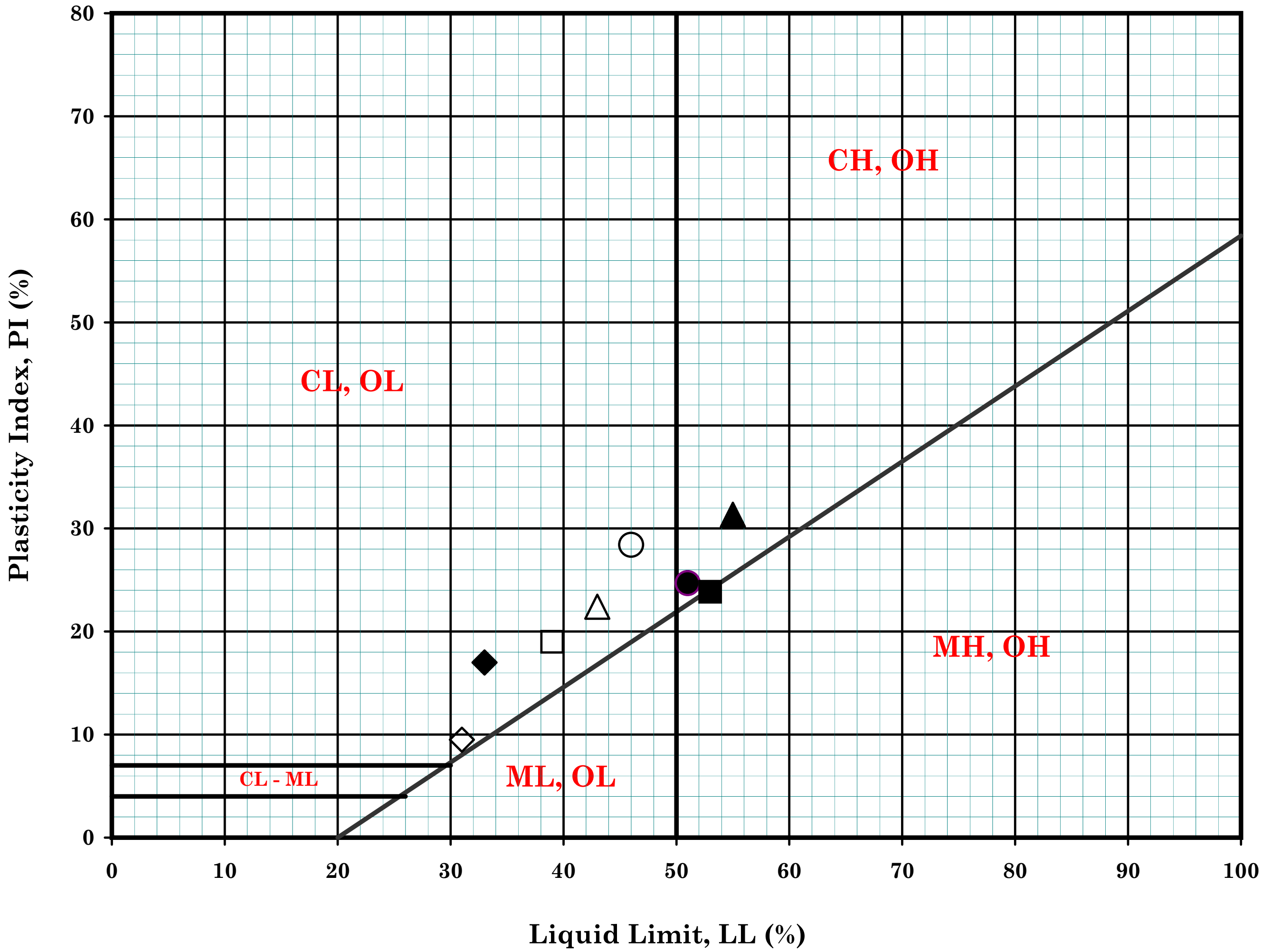
Table B-1 Summary of Lab Results

| Boring No. | Sample No. | Sample Depth (ft) | Sample Type[1] | USCS Group Symbol | SPT N (blows/ft) | Undrained Shear | | Moisture Content (%) | Dry Unit Weight (pcf) | Total Unit Weight (pcf) | Atterberg Limits | | | Grain Size Distribution (%) by | | | Expansion Index | Corrosivity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pocket Penetro-meter | Mini Vane Shear | | | | LL | PL | PI | Gravel | Sand | Fines | | Minimum Resistivity (ohm-cm) | pH | Sulfate (ppm) | Chloride (ppm) |
| R-12-15 | R-1 | 2.5 | MC | | 14 | 1 | | 24.3 | 99 | 123 | | | | | | | | | | | |
| | R-2 | 5 | MC | | 22 | 4 | | 22.2 | 101 | 123 | | | | | | | | | | | |
| | R-3 | 10 | MC | | 22 | 3.5 | | 19.1 | 110 | 131 | | | | | | | | | | | |
| | R-4 | 15 | MC | | 11 | 1.25 | | 33.3 | 86 | 115 | 51 | 26 | 25 | | | | | | | | |
| | R-5 | 20 | MC | | 10 | 0.75 | | 32.6 | 87 | 115 | 55 | 24 | 31 | | | | | | | | |
| | S-6 | 25 | SPT | | 12 | | | 32.9 | | | | | | | | | | | | | |
| | S-7 | 30 | SPT | | 44 | | | 30.9 | | | | | | 0 | 90 | 10 | | | | | |
| | S-8 | 35 | SPT | | 64 | | | 12.0 | | | | | | | | | | | | | |
| | S-9 | 40 | SPT | | 77 | | | 18.3 | | | | | | | | | | | | | |
| | S-10 | 45 | SPT | | 50/5" | | | 15.6 | | | | | | | | | | | | | |
| | S-11 | 50 | SPT | | 50/5" | | | 17.6 | | | | | | | | | | | | | |
| R-12-16 | S-1 | 5 | SPT | | 7 | | | 25.9 | | | | | | 0 | 58 | 42 | | | | | |
| | R-2a | 10 | MC | | 20 | | | | | | | | | | | | | | | | |
| | R-2b | 12 | MC | | 29 | | | 7.5 | 125 | | | | | 19 | 65 | 16 | | | | | |
| | S-3 | 15 | SPT | | 2 | | | 25.5 | | | | | | | | | | | | | |
| | R-4 | 20 | MC | | 21 | | | 25.2 | 101 | | | | | 0 | 64 | 36 | | | | | |
| | S-5 | 25 | SPT | | 8 | | | 23.5 | | | 33 | 16 | 17 | | | | | | | | |
| | S-6 | 30 | SPT | | 25 | | | 22.7 | | | | | | | | | | | | | |
| | S-7 | 35 | SPT | | 43 | | | 15.2 | | | | | | | | | | | | | |
| R-12-17 | R-1 | 5 | MC | | 19 | | | 19.9 | 102 | 122 | | | | | | | | | | | |
| | S-2 | 10 | SPT | | 12 | | | 41.7 | | | | | | | | | | | | | |
| | R-3 | 15 | MC | | 19 | | | 20.0 | 107 | 129 | | | | | | | | | | | |
| | R-4 | 20 | MC | | 20 | 1 | | 19.7 | 105 | 125 | | | | | | | | | | | |
| | S-5 | 25 | SPT | | 8 | 1.75 | | 24.1 | | | | | | | | | | | | | |
| | R-6 | 30 | MC | | 51 | 2 | | 16.8 | 113 | 132 | | | | | | | | | | | |
| | S-7 | 35 | SPT | | 58 | | | 16.1 | | | | | | | | | | | | | |
| R-12-18 | B-1 | 2 | BULK | | | | | | | | | | | | | | | 1562 | 8.62 | 9 | 0 |
| | S-2 | 5 | SPT | | 4 | | | 29.6 | | | | | | 0 | 53 | 47 | | | | | |
| | S-3 | 7.5 | SPT | | 5 | | | 42.9 | | | 53 | 29 | 24 | | | | | | | | |
| | S-4 | 10 | SPT | | 10 | | | 28.6 | | | | | | | | | | | | | |
| | S-5 | 12.5 | SPT | | 8 | | | 25.9 | | | 46 | 18 | 28 | | | | | | | | |
| | S-6 | 15 | SPT | | 4 | | | 36.6 | | | | | | | | | | | | | |
| | S-7 | 17.5 | SPT | | 8 | | | 25.9 | | | | | | 1 | 48 | 51 | | | | | |
| | S-8 | 20 | SPT | | 6 | | | 33.8 | | | | | | | | | | | | | |
| | S-9 | 22.5 | SPT | | 10 | | | 29.7 | | | 43 | 21 | 22 | | | | | | | | |
| | S-10 | 25 | SPT | | 9 | 1.75 | | 28.8 | | | | | | | | | | | | | |
| | S-11 | 27.5 | SPT | | 15 | | | 21.5 | | | 31 | 22 | 9 | | | | | | | | |
| | S-12 | 30 | SPT | | 31 | | | 26.6 | | | | | | 0 | 89 | 11 | | | | | |
| | S-13 | 32.5 | SPT | | 41 | | | 13.9 | | | | | | | | | | | | | |
| | S-14 | 35 | SPT | | 49 | | | 21.0 | | | | | | | | | | | | | |
| | S-15 | 37.5 | SPT | | 52 | | | 13.8 | | | | | | | | | | | | | |
| | S-16 | 40 | SPT | | 43 | | | 11.0 | | | | | | | | | | | | | |
| | S-17 | 42.5 | SPT | | 61 | | | 19.6 | | | | | | | | | | | | | |
| | S-18 | 45 | SPT | | 58 | | | 22.2 | | | | | | | | | | | | | |
| | S-19 | 47.5 | SPT | | 78 | | | 19.1 | | | | | | | | | | | | | |
| | S-20 | 50 | SPT | | 54/6" | | | 22.1 | | | | | | | | | | | | | |
| R-12-19 | R-1 | 2.5 | MC | | 31 | | | 11.8 | 118 | 131 | | | | | | | | | | | |
| | R-2 | 5 | MC | | 40 | | | 3.4 | | | | | | | | | | | | | |
| | R-3 | 10 | MC | | 5 | 0 | | 36.0 | 85 | 115 | | | | | | | | | | | |
| | R-4a | 15 | MC | | 16 | | | | | | | | | | | | | | | | |
| | R-4b | 16.5 | MC | | 16 | 1 | | 27.6 | 95 | 121 | | | | | | | | | | | |
| | R-5 | 20 | MC | | 12 | 0.75 | 1.1 | 18.7 | 104 | 124 | | | | | | | | | | | |
| | R-6 | 25 | MC | | 12 | 1 | 1.6 | 33.2 | 89 | 118 | | | | | | | | | | | |

Table B-1 Summary of Lab Results

| Boring No. | Sample No. | Sample Depth (ft) | Sample Type[1] | USCS Group Symbol | SPT N (blows/ft) | Undrained Shear | | Moisture Content (%) | Dry Unit Weight (pcf) | Total Unit Weight (pcf) | Atterberg Limits | | | Grain Size Distribution (%) by | | | Expansion Index | Corrosivity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pocket Penetro-meter | Mini Vane Shear | | | | LL | PL | PI | Gravel | Sand | Fines | | Minimum Resistivity (ohm-cm) | pH | Sulfate (ppm) | Chloride (ppm) |
| | S-7 | 30 | SPT | | 9 | | | 31.7 | | | | | | | | | | | | | |
| | S-8 | 35 | SPT | | 52 | | | 24.4 | | | | | | | | | | | | | |
| R-12-20 | B-1 | 1 | BULK | | | | | | | | 39 | 20 | 19 | | | | 53 | | | | |
| | R-2 | 5 | MC | | 5 | | | 26.1 | 97 | 122 | | | | | | | | | | | |
| | R-3 | 10 | MC | | 7 | | | 46.7 | | | | | | | | | | | | | |
| | R-4 | 15 | MC | | 12 | | | | | | | | | | | | | | | | |
| | R-5 | 16.5 | MC | | 11 | | | 26.2 | 96 | 121 | | | | | | | | | | | |
| | R-6 | 20 | MC | | 18 | | | 31.4 | 92 | 121 | | | | | | | | | | | |
| | R-7 | 25 | MC | | 20 | | | | | | | | | | | | | | | | |
| | S-8 | 30 | SPT | | 45 | | | 15.6 | | | | | | | | | | | | | |
| | S-9 | 35 | SPT | | 48 | | | 9.2 | | | | | | | | | | | | | |
| | S-10 | 40 | SPT | | 63 | | | 12.6 | | | | | | | | | | | | | |
| | S-11 | 45 | SPT | | 55 | | | 10.6 | | | | | | | | | | | | | |
| | S-12 | 50 | SPT | | 62 | | | 13.6 | | | | | | | | | | | | | |

# PLASTICITY CHART




| Symbol | Boring No. | Sample No. | Depth (ft) | Depth (m) | MC (%) | LL (%) | PL (%) | PI (%) | LI | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | R-12-15 | R4 | 15.0 | 4.6 | 33.3 | 51 | 26 | 25 | 0.3 | Fat Clay (CH) |
| ▲ | R-12-15 | R5 | 20.0 | 6.1 | 32.6 | 55 | 24 | 31 | 0.3 | Fat Clay (CH) |
| ◆ | R-12-16 | S5 | 25.0 | 7.6 | 23.4 | 33 | 16 | 17 | 0.4 | Sandy Lean Clay (CL) |
| ■ | R-12-18 | S3 | 7.5 | 2.3 | 42.9 | 53 | 29 | 24 | 0.6 | Fat Clay (CH) or Elastic Silt (MH) |
| ○ | R-12-18 | S5 | 12.5 | 3.8 | 25.9 | 46 | 18 | 28 | 0.3 | Lean Clay with Sand (CL) |
| △ | R-12-18 | S9 | 22.5 | 6.9 | 29.7 | 43 | 21 | 22 | 0.4 | Lean Clay (CL) |
| ◇ | R-12-18 | S11 | 27.5 | 8.4 | 21.5 | 31 | 22 | 9 | 0.0 | Sandy Clay (CL) |
| □ | R-12-20 | B-1 | 2.0 | 0.6 | - | 39 | 20 | 19 | - | Lean Clay (CL) |

Remark :

GROUP DELTA CONSULTANTS

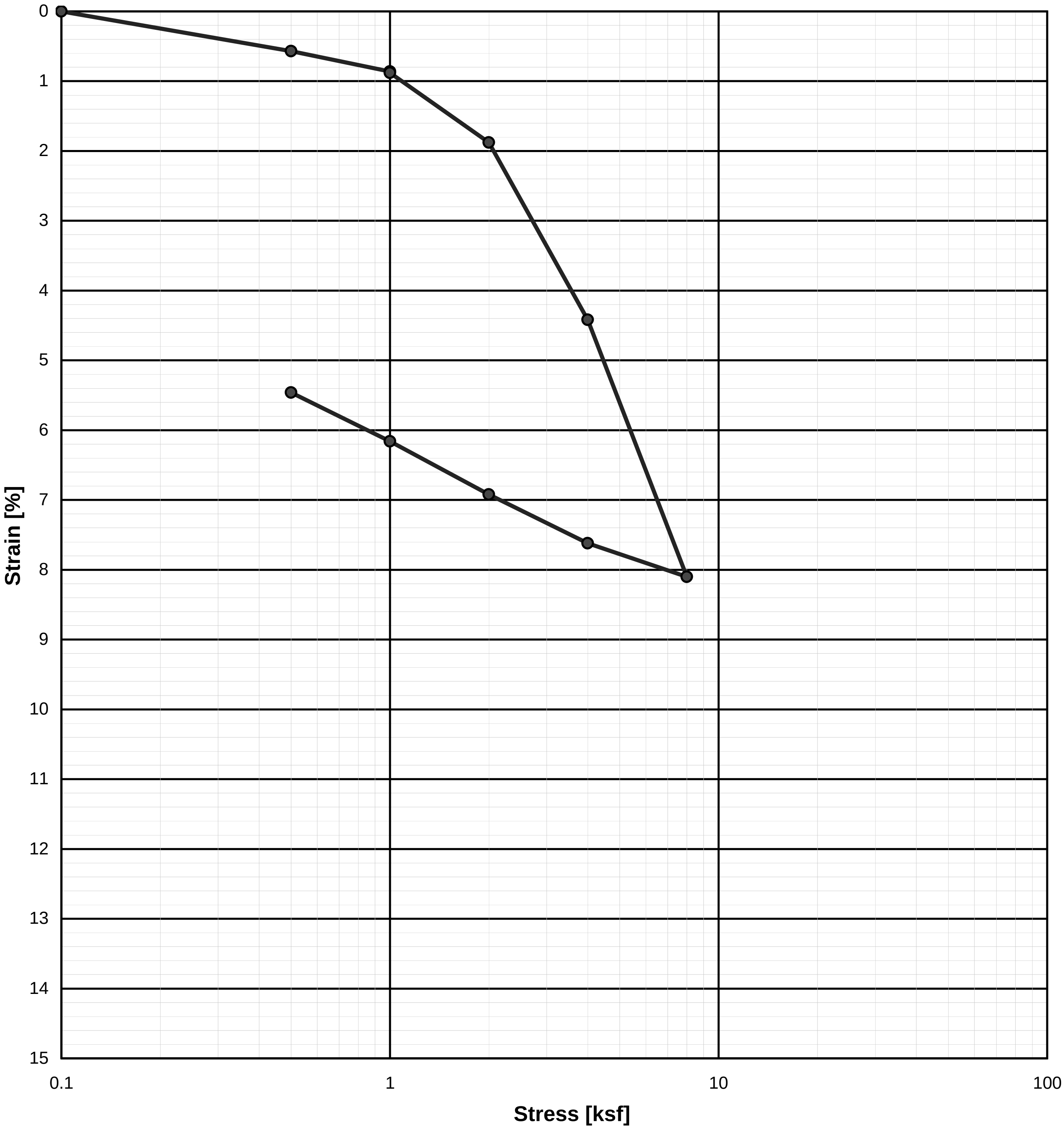
*Marina Del Rey - Parcel 44*

Project No. : *LA-1049*

Date : *03/21/12*

ATTERBERG LIMITS
(ASTM D-4318-84)

Figure No. : B-1




**Sample:**

R-12-15 @ 20'

**Description**:

Fat Clay (CH)

(Water Added at 1.0 ksf)

| | Initial | Final | |
|---|---|---|---|
| Height: | 1.0000 | 0.9470 | [in] |
| Dry Density: | 88.1 | 93.1 | [pcf] |
| Void Ratio (e): | 0.98 | 0.87 | |
| Water Content: | 33.3 | 31.3 | [%] |
| Saturation: | 95 | 100 | [%] |

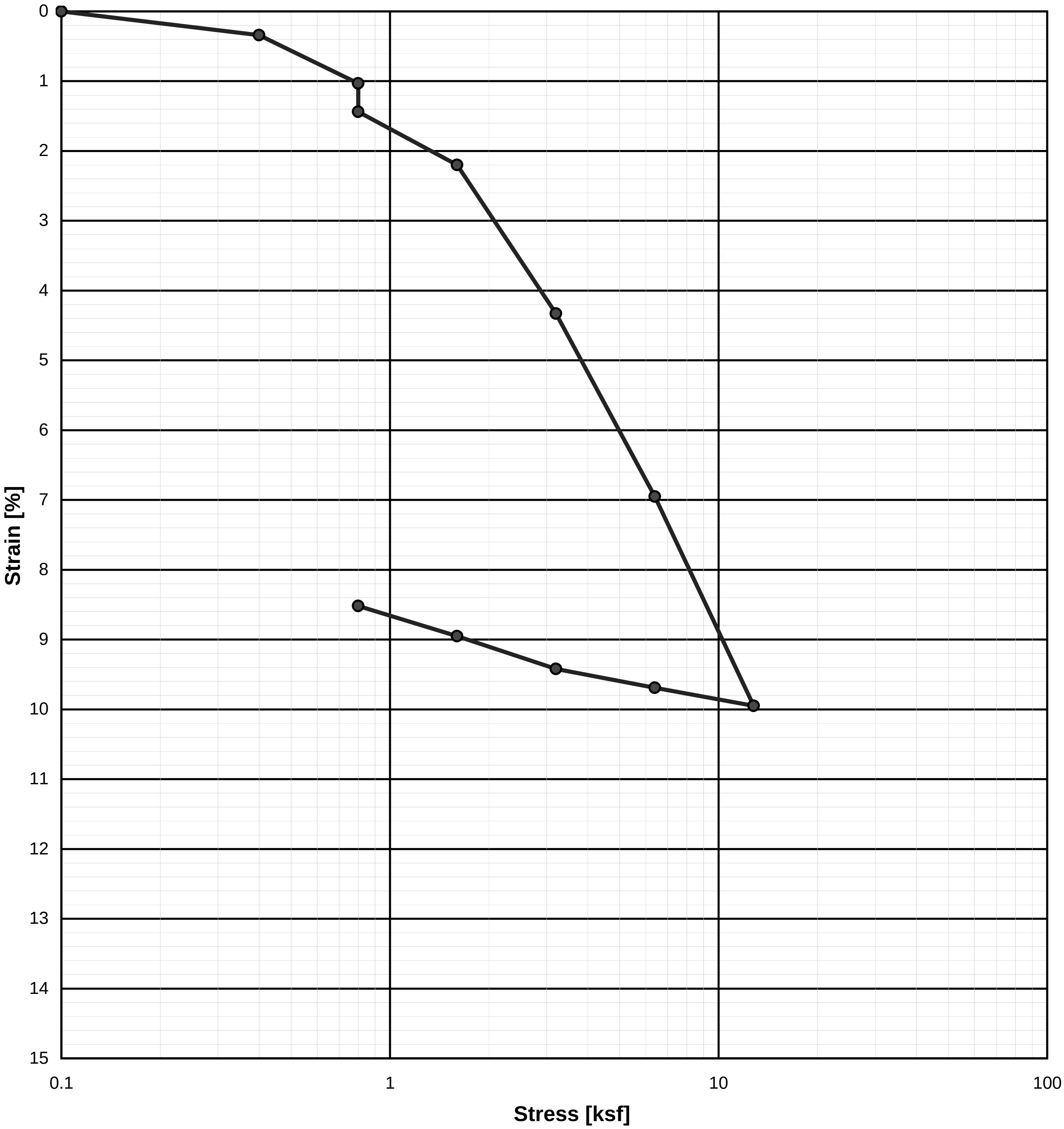
Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiply by 1.98 (or 1+e)

370 Amapola Avenue, Suite 212, Torrance, CA 90501
32 Mauchly, Suite B, Irvine, CA 92618
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

**CONSOLIDATION RESULTS**

Project No. LA-1049

**FIGURE B-2**




**Sample:**

R-12-20 @ 5'

**Description**:

Silt (ML)

(Water Added at 0.8 ksf)

| | Initial | Final | |
|---|---|---|---|
| Height: | 1.0000 | 0.9040 | [in] |
| Dry Density: | 100.2 | 110.8 | [pcf] |
| Void Ratio (e): | 0.68 | 0.52 | |
| Water Content: | 23.2 | 19.3 | [%] |
| Saturation: | 92 | 100 | [%] |

Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiply by 1.68 (or 1+e)

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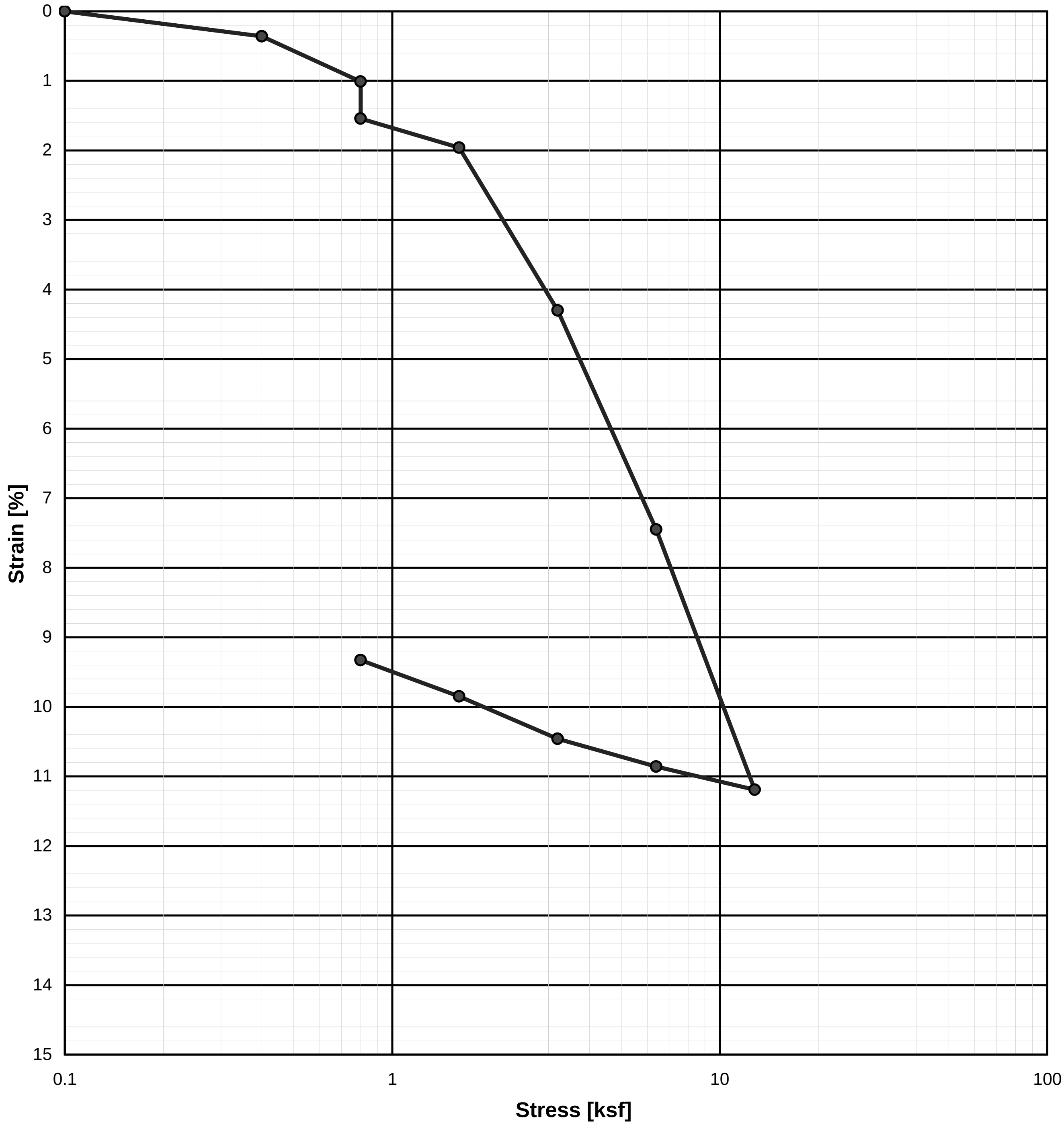
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

**CONSOLIDATION RESULTS**

Project No. LA-1049

**FIGURE B-3**




**Sample:**

R-12-20 @ 16.5'

**Description**:

Fat Clay (CH)

(Water Added at 0.8 ksf)

| | Initial | Final | |
|---|---|---|---|
| Height: | 1.0000 | 0.8946 | [in] |
| Dry Density: | 88.5 | 98.9 | [pcf] |
| Void Ratio (e): | 1.00 | 0.79 | |
| Water Content: | 33.3 | 27.9 | [%] |
| Saturation: | 94 | 100 | [%] |

Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiply by 2 (or 1+e)

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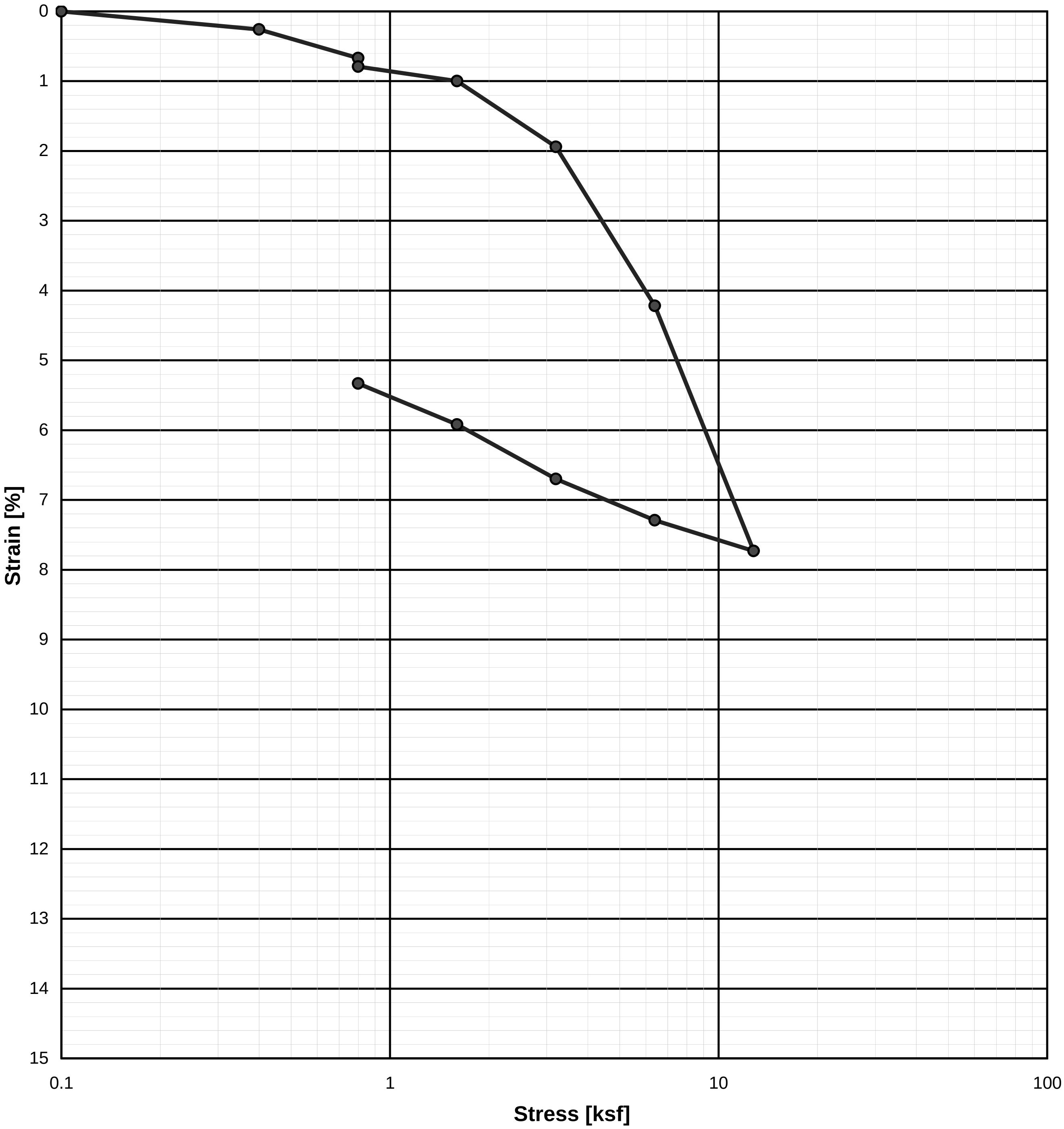
32 Mauchly, Suite B, Irvine, CA 92618
4201 Santa Ana St., Suite F, Ontario, CA 91761
9245 Activity Road, Suite 103, San Diego, CA 92126

**CONSOLIDATION RESULTS**

Project No. LA-1049

**FIGURE B-4**




**Sample:**

R-12-20 @ 25'

**Description**:

Fat Clay (CH)

(Water Added at 0.8 ksf)

| | Initial | Final | |
|---|---|---|---|
| Height: | 1.0000 | 0.9470 | [in] |
| Dry Density: | 87.6 | 92.6 | [pcf] |
| Void Ratio (e): | 1.01 | 0.90 | |
| Water Content: | 33.9 | 32.1 | [%] |
| Saturation: | 95 | 100 | [%] |

Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiply by 2.01 (or 1+e)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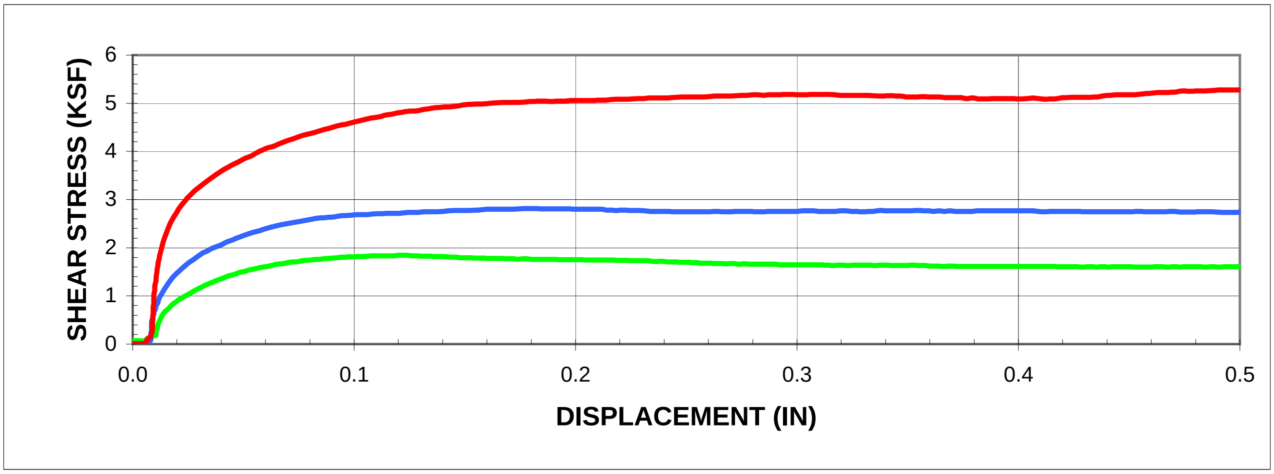
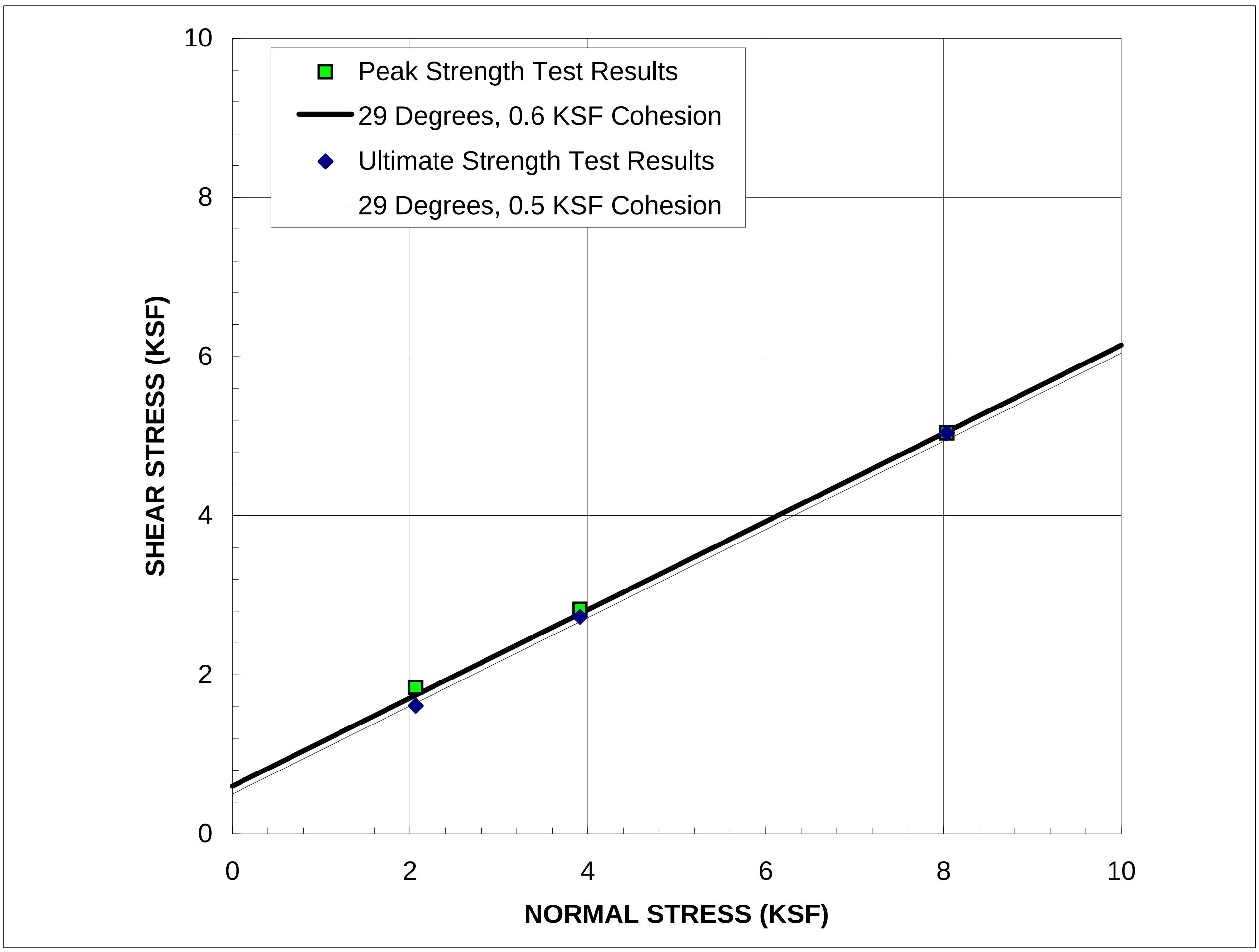
**CONSOLIDATION RESULTS**

Project No. LA-1049

**FIGURE B-5**




| SAMPLE: | R-12-15 @ 2.5' | | PEAK | ULTIMATE |
|---|---|---|---|---|
| **Description**: | Black Sandy Clay with Traces of Gravel | $\phi'$ | 29 $^o$ | 29 $^o$ |
| | | c' | 0.60 KSF | 0.50 KSF |

| | | | IN-SITU | AS-TESTED |
|---|---|---|---|---|
| **STRAIN RATE:** | 0.0030 IN/MIN | $\gamma_d$ | PCF | 0.0 PCF |
| (Sample was consolidated and drained) | | $w_c$ | % | 23.0 % |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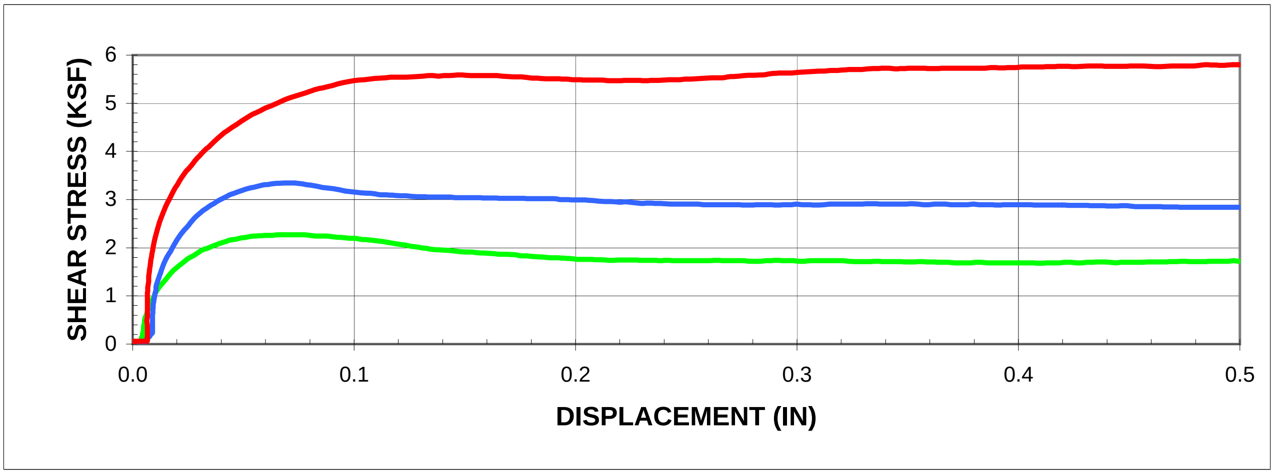
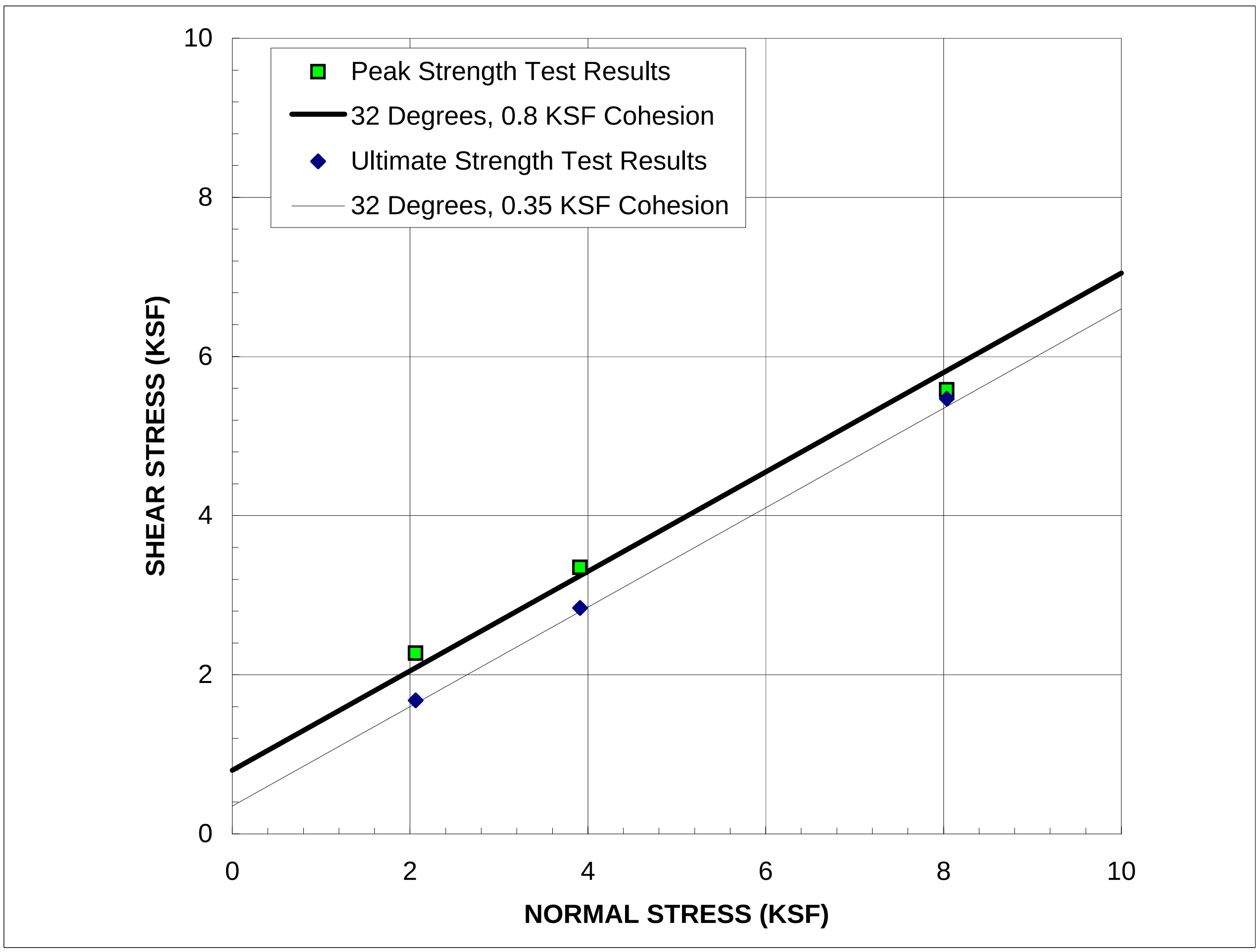
**DIRECT SHEAR TEST RESULTS**

Project No.: LA-1049

**FIGURE B-6**




**SAMPLE:** R-12-15 @ 5.0'

| | |
|---|---|
| **Description**: | Very Dark Gray Sandy Clay with Traces of Gravel |

| | PEAK | ULTIMATE |
|---|---|---|
| $\phi'$ | 32 ° | 32 ° |
| c' | 0.80 KSF | 0.35 KSF |

**STRAIN RATE:** 0.0030 IN/MIN

(Sample was consolidated and drained)

| | IN-SITU | AS-TESTED |
|---|---|---|
| $\gamma_d$ | PCF | 0.0 PCF |
| $w_c$ | % | 24.0 % |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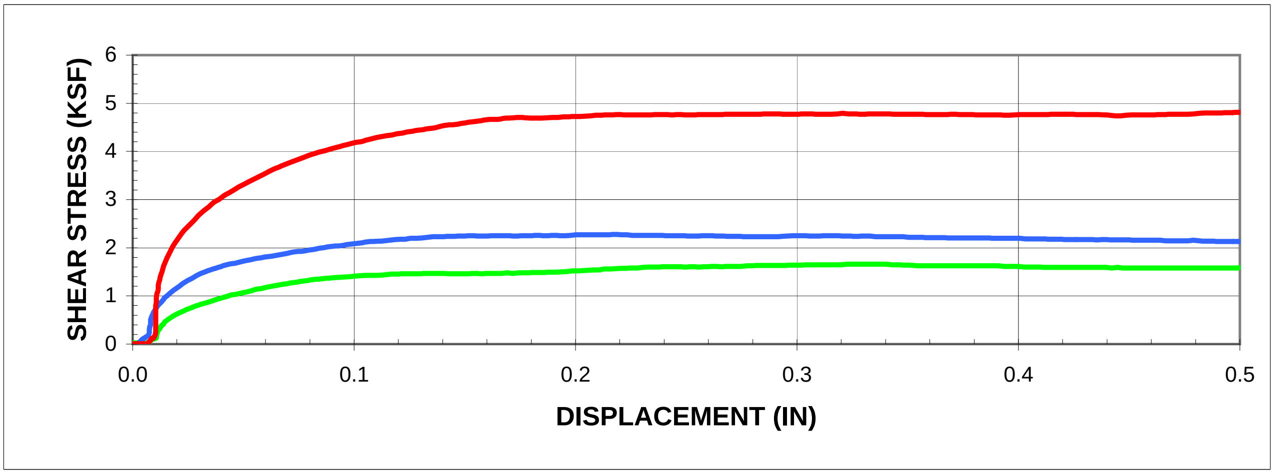
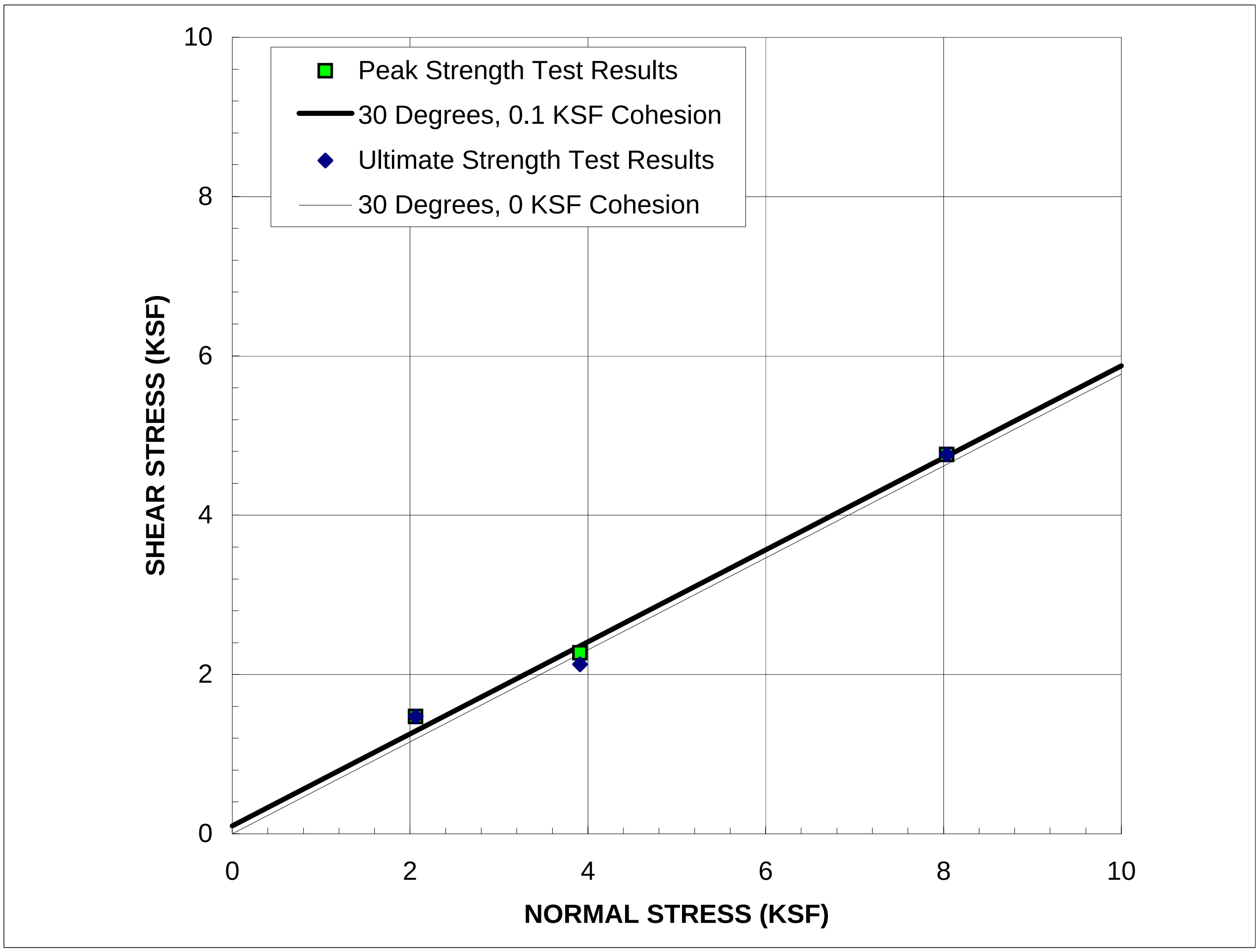
**DIRECT SHEAR TEST RESULTS**

Project No.: LA1049

**FIGURE B-7**




**SAMPLE:** R-12-19 R3@10'

| | | | PEAK | ULTIMATE |
|---|---|---|---|---|
| **Description**: | Olive Brown Clayey Silty Sand / Clayey Sandy Silt | φ' | 30 ° | 30 ° |
| | | c' | 0.10 KSF | 0.00 KSF |

**STRAIN RATE:** 0.0030 IN/MIN

(Sample was consolidated and drained)

| | IN-SITU | AS-TESTED |
|---|---|---|
| $\gamma_d$ | PCF | 0.0 PCF |
| $w_c$ | % | 32.3 % |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**DIRECT SHEAR TEST RESULTS**

Project No.: LA1049

**FIGURE B-8**

# APPENDIX C
# LIQUEFACTION ANALYSIS

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Rey -Parcel 44 |
| Project No. | LA-1049 |
| Location | Marina Del Rey |
| Exploration No. | CPT-12-01 |

| REFERENCES |
|---|
| + Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001) |
| ++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$ |
| +++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28 |
| * Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990) |
| ** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987). |
| Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change. |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 12.00 ft |
| GWT Elev. During Test | -7.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

| | |
|---|---|
| GWT Depth During Test, Zw = | 19.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 7.00 ft below ground surface |

| *** SUMMARY OF RESULTS *** | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 5.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.37 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.38 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 82.70 | 0.92 | 1.11 | sand to silty sand | 11.0 | 1.00 | 21 | 60 | 60 | 60 | 1.49 | 1.00 | 477.47 | 0.999 | N/A | 0.260 | N/A | N/A | NO | N/A | N/A | N/A | 39.3 | 0.013 | 0.010 | 0.00 | 0.38 |
| 1.50 | 80.20 | 1.95 | 2.43 | sandy silt to clayey silt | 10.0 | 1.00 | 32 | 180 | 180 | 180 | 1.91 | 1.20 | 321.50 | 0.997 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | 70.4 | N/A | N/A | N/A | 0.38 |
| 2.50 | 74.32 | 0.91 | 1.23 | sand to silty sand | 9.0 | 1.00 | 19 | 300 | 300 | 300 | 1.77 | 1.08 | 207.99 | 0.994 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 35.6 | 0.030 | 0.026 | 0.00 | 0.37 |
| 3.50 | 99.98 | 0.92 | 0.92 | sand to silty sand | 8.0 | 1.00 | 25 | 420 | 420 | 420 | 1.64 | 1.00 | 218.18 | 0.992 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 47.0 | 0.032 | 0.000 | 0.00 | 0.37 |
| 4.50 | 55.88 | 0.92 | 1.64 | silty sand to sandy silt | 7.0 | 1.00 | 19 | 540 | 540 | 540 | 2.03 | 1.35 | 144.82 | 0.990 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 43.0 | 0.038 | 0.000 | 0.00 | 0.37 |
| 5.50 | 31.42 | 0.58 | 1.83 | sandy silt to clayey silt | 6.0 | 1.66 | 21 | 660 | 660 | 660 | 1.97 | 1.27 | 114.67 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 47.4 | N/A | N/A | N/A | 0.37 |
| 6.50 | 13.12 | 0.39 | 2.96 | silty clay to clay | 5.0 | 1.00 | 9 | 780 | 780 | 780 | 2.66 | N/A | N/A | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 7.50 | 16.98 | 0.65 | 3.79 | silty clay to clay | 4.0 | 1.00 | 11 | 900 | 869 | 900 | 2.67 | N/A | N/A | 0.983 | N/A | 0.265 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 8.50 | 35.95 | 1.08 | 2.99 | clayey silt to silty clay | 3.0 | 1.00 | 18 | 1,020 | 926 | 1,020 | 2.44 | 2.48 | 130.95 | 0.980 | 1.000 | 0.281 | 0.289 | 1.322 | NO | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.00 | 0.37 |
| 9.50 | 23.00 | 0.57 | 2.49 | clayey silt to silty clay | 2.0 | 1.00 | 12 | 1,140 | 984 | 1,140 | 2.54 | 3.00 | 98.24 | 0.978 | 1.000 | 0.295 | 0.168 | 0.733 | YES | 2.8 | 18.0 | 979 | N/A | N/A | 0.000 | 0.00 | 0.37 |
| 10.50 | 13.73 | 0.44 | 3.22 | silty clay to clay | 1.0 | 1.00 | 9 | 1,260 | 1,042 | 1,260 | 2.75 | N/A | N/A | 0.976 | N/A | 0.307 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 11.50 | 23.92 | 0.75 | 3.14 | clayey silt to silty clay | 0.0 | 1.00 | 12 | 1,380 | 1,099 | 1,380 | 2.57 | 3.13 | 117.31 | 0.973 | 1.000 | 0.318 | 0.230 | 0.931 | YES | 2.8 | 17.2 | 893 | N/A | N/A | 0.000 | 0.00 | 0.37 |
| 12.50 | 43.82 | 1.37 | 3.11 | clayey silt to silty clay | -1.0 | 1.00 | 22 | 1,500 | 1,157 | 1,500 | 2.43 | 2.42 | 139.45 | 0.971 | 1.000 | 0.327 | 0.332 | 1.304 | NO | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.00 | 0.37 |
| 13.50 | 25.42 | 1.15 | 4.51 | clay | -2.0 | 1.00 | 25 | 1,620 | 1,214 | 1,620 | 2.68 | N/A | N/A | 0.969 | N/A | 0.336 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 14.50 | 16.77 | 0.38 | 2.26 | clayey silt to silty clay | -3.0 | 1.00 | 8 | 1,740 | 1,272 | 1,740 | 2.64 | N/A | N/A | 0.966 | N/A | 0.344 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 15.50 | 10.50 | 0.18 | 1.71 | clayey silt to silty clay | -4.0 | 1.00 | 5 | 1,860 | 1,330 | 1,860 | 2.76 | N/A | N/A | 0.964 | N/A | 0.351 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 16.50 | 11.13 | 0.26 | 2.31 | clayey silt to silty clay | -5.0 | 1.00 | 6 | 1,980 | 1,387 | 1,980 | 2.82 | N/A | N/A | 0.962 | N/A | 0.357 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 17.50 | 13.90 | 0.40 | 2.83 | clayey silt to silty clay | -6.0 | 1.00 | 7 | 2,100 | 1,445 | 2,100 | 2.80 | N/A | N/A | 0.959 | N/A | 0.362 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 18.50 | 16.47 | 0.67 | 4.03 | silty clay to clay | -7.0 | 1.00 | 11 | 2,220 | 1,502 | 2,220 | 2.85 | N/A | N/A | 0.957 | N/A | 0.368 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 19.50 | 14.73 | 0.55 | 3.69 | silty clay to clay | -8.0 | 1.00 | 10 | 2,340 | 1,560 | 2,309 | 2.87 | N/A | N/A | 0.955 | N/A | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 20.50 | 71.61 | 0.69 | 0.97 | sand to silty sand | -9.0 | 1.00 | 18 | 2,460 | 1,618 | 2,366 | 1.98 | 1.28 | 101.83 | 0.952 | 1.000 | 0.376 | 0.178 | 0.608 | YES | 1.3 | 17.8 | 954 | 19.7 | N/A | 1.429 | 0.17 | 0.20 |
| 21.50 | 72.32 | 0.75 | 1.03 | sand to silty sand | -10.0 | 1.66 | 30 | 2,580 | 1,675 | 2,424 | 1.69 | 1.03 | 135.33 | 0.950 | 1.000 | 0.380 | 0.310 | 1.049 | YES | 1.3 | 28.5 | 1,200 | 31.0 | N/A | 0.080 | 0.01 | 0.19 |
| 22.50 | 14.52 | 0.35 | 2.38 | clayey silt to silty clay | -11.0 | 1.00 | 7 | 2,700 | 1,733 | 2,482 | 2.79 | N/A | N/A | 0.948 | N/A | 0.384 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.19 |
| 23.50 | 8.30 | 0.22 | 2.58 | silty clay to clay | -12.0 | 1.00 | 6 | 2,820 | 1,790 | 2,539 | 3.05 | N/A | N/A | 0.945 | N/A | 0.387 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.19 |
| 24.50 | 10.47 | 0.28 | 2.64 | silty clay to clay | -13.0 | 1.00 | 7 | 2,940 | 1,848 | 2,597 | 2.97 | N/A | N/A | 0.943 | N/A | 0.390 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.19 |
| 25.50 | 12.42 | 0.43 | 3.44 | silty clay to clay | -14.0 | 1.00 | 8 | 3,060 | 1,906 | 2,654 | 2.98 | N/A | N/A | 0.941 | N/A | 0.393 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.19 |
| 26.50 | 12.37 | 0.38 | 3.04 | silty clay to clay | -15.0 | 1.00 | 8 | 3,180 | 1,963 | 2,712 | 2.96 | N/A | N/A | 0.938 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.19 |
| 27.50 | 80.90 | 0.82 | 1.02 | sand to silty sand | -16.0 | 1.00 | 20 | 3,300 | 2,021 | 2,770 | 1.99 | 1.29 | 103.99 | 0.936 | 0.997 | 0.397 | 0.185 | 0.595 | YES | 1.3 | 18.5 | 1,030 | 20.5 | N/A | 1.403 | 0.17 | 0.02 |
| 28.50 | 192.05 | 1.25 | 0.65 | sand | -17.0 | 1.00 | 38 | 3,420 | 2,078 | 2,827 | 1.58 | 1.00 | 188.39 | 0.934 | 0.985 | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 32.3 | N/A | 0.072 | 0.01 | 0.01 |
| 29.50 | 201.48 | 0.98 | 0.49 | sand | -18.0 | 1.00 | 40 | 3,540 | 2,136 | 2,885 | 1.49 | 1.00 | 194.96 | 0.931 | 0.974 | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 33.6 | N/A | 0.061 | 0.01 | 0.01 |
| 30.50 | 284.85 | 1.41 | 0.50 | gravelly sand to sand | -19.0 | 1.00 | 47 | 3,660 | 2,194 | 2,942 | 1.38 | 1.00 | 271.99 | 0.926 | 0.964 | 0.402 | N/A | N/A | NO | N/A | N/A | N/A | 39.1 | N/A | 0.008 | 0.00 | 0.01 |
| 31.50 | 502.14 | 3.71 | 0.74 | gravelly sand to sand | -20.0 | 1.00 | 84 | 3,780 | 2,251 | 3,000 | 1.35 | 1.00 | 473.30 | 0.918 | 0.954 | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 68.3 | N/A | 0.000 | 0.00 | 0.01 |
| 32.50 | 297.43 | 1.89 | 0.64 | gravelly sand to sand | -21.0 | 1.00 | 50 | 3,900 | 2,309 | 3,058 | 1.45 | 1.00 | 276.83 | 0.909 | 0.944 | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 40.1 | N/A | 0.000 | 0.00 | 0.01 |
| 33.50 | 368.45 | 2.25 | 0.61 | gravelly sand to sand | -22.0 | 1.00 | 61 | 4,020 | 2,366 | 3,115 | 1.38 | 1.00 | 338.73 | 0.901 | 0.935 | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 49.2 | N/A | 0.000 | 0.00 | 0.01 |
| 34.50 | 265.90 | 1.22 | 0.46 | gravelly sand to sand | -23.0 | 1.00 | 44 | 4,140 | 2,424 | 3,173 | 1.40 | 1.00 | 241.53 | 0.893 | 0.926 | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | 35.2 | N/A | 0.045 | 0.01 | 0.00 |
| 35.50 | 459.55 | 4.08 | 0.89 | gravelly sand to sand | -24.0 | 1.00 | 77 | 4,260 | 2,482 | 3,230 | 1.45 | 1.00 | 412.56 | 0.885 | 0.917 | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | 60.3 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 562.73 | 4.95 | 0.88 | gravelly sand to sand | -25.0 | 1.00 | 94 | 4,380 | 2,539 | 3,288 | 1.40 | 1.00 | 499.42 | 0.877 | 0.909 | 0.393 | N/A | N/A | NO | N/A | N/A | N/A | 73.1 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 525.83 | 2.44 | 0.46 | gravelly sand to sand | -26.0 | 1.00 | 88 | 4,500 | 2,597 | 3,346 | 1.20 | 1.00 | 461.47 | 0.869 | 0.901 | 0.391 | N/A | N/A | NO | N/A | N/A | N/A | 67.8 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 541.90 | 1.87 | 0.35 | gravelly sand to sand | -27.0 | 1.00 | 90 | 4,620 | 2,654 | 3,403 | 1.10 | 1.00 | 470.38 | 0.861 | 0.893 | 0.389 | N/A | N/A | NO | N/A | N/A | N/A | 69.2 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 688.02 | 1.81 | 0.26 | gravelly sand to sand | -28.0 | 1.00 | 115 | 4,740 | 2,712 | 3,461 | 0.95 | 1.00 | 590.84 | 0.852 | 0.885 | 0.387 | N/A | N/A | NO | N/A | N/A | N/A | 87.2 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 526.25 | 2.13 | 0.41 | gravelly sand to sand | -29.0 | 1.00 | 88 | 4,860 | 2,770 | 3,518 | 1.17 | 1.00 | 447.20 | 0.844 | 0.878 | 0.385 | N/A | N/A | NO | N/A | N/A | N/A | 66.1 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 467.60 | 2.31 | 0.49 | gravelly sand to sand | -30.0 | 1.00 | 78 | 4,980 | 2,827 | 3,576 | 1.27 | 1.00 | 393.29 | 0.836 | 0.871 | 0.383 | N/A | N/A | NO | N/A | N/A | N/A | 58.3 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 484.78 | 3.09 | 0.64 | gravelly sand to sand | -31.0 | 1.00 | 81 | 5,100 | 2,885 | 3,634 | 1.34 | 1.00 | 403.65 | 0.828 | 0.864 | 0.381 | N/A | N/A | NO | N/A | N/A | N/A | 59.9 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 485.45 | 3.32 | 0.68 | gravelly sand to sand | -32.0 | 1.00 | 81 | 5,220 | 2,942 | 3,691 | 1.37 | 1.00 | 400.23 | 0.820 | 0.857 | 0.378 | N/A | N/A | NO | N/A | N/A | N/A | 59.6 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 561.23 | 2.80 | 0.50 | gravelly sand to sand | -33.0 | 1.00 | 94 | 5,340 | 3,000 | 3,749 | 1.23 | 1.00 | 458.25 | 0.812 | 0.850 | 0.376 | N/A | N/A | NO | N/A | N/A | N/A | 68.3 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 475.50 | 2.05 | 0.43 | gravelly sand to sand | -34.0 | 1.00 | 79 | 5,460 | 3,058 | 3,806 | 1.23 | 1.00 | 384.57 | 0.804 | 0.844 | 0.373 | N/A | N/A | NO | N/A | N/A | N/A | 57.4 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 327.37 | 2.66 | 0.81 | sand | -35.0 | 1.00 | 65 | 5,580 | 3,115 | 3,864 | 1.55 | 1.00 | 262.31 | 0.795 | 0.838 | 0.370 | N/A | N/A | NO | N/A | N/A | N/A | 47.1 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 450.90 | 3.10 | 0.69 | gravelly sand to sand | -36.0 | 1.00 | 75 | 5,700 | 3,173 | 3,922 | 1.40 | 1.00 | 358.00 | 0.787 | 0.831 | 0.368 | N/A | N/A | NO | N/A | N/A | N/A | 53.7 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 561.48 | 3.38 | 0.60 | gravelly sand to sand | -37.0 | 1.00 | 94 | 5,820 | 3,230 | 3,979 | 1.30 | 1.00 | 441.80 | 0.779 | 0.825 | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | 66.3 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 480.37 | 4.52 | 0.94 | sand | -38.0 | 1.00 | 96 | 5,940 | 3,288 | 4,037 | 1.49 | 1.00 | 374.65 | 0.771 | 0.820 | 0.362 | N/A | N/A | NO | N/A | N/A | N/A | 67.6 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 893 |
| avg= | 1,011 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)
(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-02 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 12.00 ft |
| GWT Elev. During Test | 1.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow \gg}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 11.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 7.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 15.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 1.23 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 1.23 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 5.50 | 16.85 | 0.36 | 2.14 | clayey silt to silty clay | 6.0 | 1.00 | 8 | 660 | 660 | 660 | 2.54 | 2.97 | 86.98 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.23 |
| 6.50 | 18.73 | 0.45 | 2.39 | clayey silt to silty clay | 5.0 | 1.00 | 9 | 780 | 780 | 780 | 2.56 | 3.09 | 92.81 | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.23 |
| 7.50 | 29.08 | 0.81 | 2.78 | sandy silt to clayey silt | 4.0 | 1.00 | 12 | 900 | 869 | 900 | 2.47 | 2.64 | 116.59 | 0.983 | 1.000 | 0.265 | 0.227 | 1.104 | YES | 2.8 | 20.1 | 1,200 | 25.8 | N/A | 0.079 | 0.01 | 1.23 |
| 8.50 | 21.27 | 0.57 | 2.68 | clayey silt to silty clay | 3.0 | 1.00 | 11 | 1,020 | 926 | 1,020 | 2.58 | 3.20 | 100.06 | 0.980 | 1.000 | 0.281 | 0.173 | 0.793 | YES | 2.8 | 17.7 | 944 | N/A | N/A | 0.000 | 0.00 | 1.23 |
| 9.50 | 16.72 | 0.37 | 2.22 | clayey silt to silty clay | 2.0 | 1.00 | 8 | 1,140 | 984 | 1,140 | 2.56 | 3.11 | 88.39 | 0.978 | 1.000 | 0.295 | 0.144 | 0.629 | YES | 2.8 | 13.9 | 581 | N/A | N/A | 0.000 | 0.00 | 1.23 |
| 10.50 | 14.97 | 0.42 | 2.79 | clayey silt to silty clay | 1.0 | 1.00 | 7 | 1,260 | 1,042 | 1,260 | 2.68 | N/A | N/A | 0.976 | N/A | 0.307 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.23 |
| 11.50 | 30.78 | 0.76 | 2.47 | sandy silt to clayey silt | 0.0 | 1.00 | 12 | 1,380 | 1,099 | 1,349 | 2.46 | 2.59 | 107.40 | 0.973 | 1.000 | 0.318 | 0.195 | 0.789 | YES | 2.8 | 17.8 | 954 | 23.0 | N/A | 0.305 | 0.04 | 1.19 |
| 12.50 | 46.73 | 0.48 | 1.02 | silty sand to sandy silt | -1.0 | 1.66 | 26 | 1,500 | 1,157 | 1,406 | 1.78 | 1.09 | 111.15 | 0.971 | 1.000 | 0.327 | 0.208 | 0.815 | YES | 2.8 | 33.6 | 1,200 | 41.9 | N/A | 0.000 | 0.00 | 1.19 |
| 13.50 | 14.47 | 0.30 | 2.05 | clayey silt to silty clay | -2.0 | 1.00 | 7 | 1,620 | 1,214 | 1,464 | 2.65 | N/A | N/A | 0.969 | N/A | 0.336 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.19 |
| 14.50 | 9.95 | 0.21 | 2.09 | clayey silt to silty clay | -3.0 | 1.00 | 5 | 1,740 | 1,272 | 1,522 | 2.81 | N/A | N/A | 0.966 | N/A | 0.344 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.19 |
| 15.50 | 14.48 | 0.34 | 2.36 | clayey silt to silty clay | -4.0 | 1.00 | 7 | 1,860 | 1,330 | 1,579 | 2.71 | N/A | N/A | 0.964 | N/A | 0.351 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.19 |
| 16.50 | 10.20 | 0.25 | 2.41 | silty clay to clay | -5.0 | 1.00 | 7 | 1,980 | 1,387 | 1,637 | 2.86 | N/A | N/A | 0.962 | N/A | 0.357 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.19 |
| 17.50 | 22.70 | 0.52 | 2.30 | sandy silt to clayey silt | -6.0 | 1.00 | 9 | 2,100 | 1,445 | 1,694 | 2.57 | 3.14 | 91.10 | 0.959 | 1.000 | 0.362 | 0.150 | 0.533 | YES | 2.8 | 12.7 | 485 | 16.8 | N/A | 1.691 | 0.20 | 0.99 |
| 18.50 | 70.55 | 0.54 | 0.77 | sand to silty sand | -7.0 | 1.00 | 18 | 2,220 | 1,502 | 1,752 | 1.92 | 1.20 | 98.02 | 0.957 | 1.000 | 0.368 | 0.168 | 0.586 | YES | 1.3 | 20.2 | 1,200 | 22.2 | N/A | 1.153 | 0.14 | 0.85 |
| 19.50 | 40.70 | 0.90 | 2.19 | sandy silt to clayey silt | -8.0 | 1.00 | 16 | 2,340 | 1,560 | 1,810 | 2.40 | 2.30 | 105.92 | 0.955 | 1.000 | 0.372 | 0.191 | 0.657 | YES | 2.8 | 19.9 | 1,177 | 25.5 | N/A | 0.277 | 0.03 | 0.81 |
| 20.50 | 24.31 | 0.40 | 1.62 | sandy silt to clayey silt | -9.0 | 1.66 | 16 | 2,460 | 1,618 | 1,867 | 2.19 | 1.65 | 73.94 | 0.952 | 1.000 | 0.376 | 0.118 | 0.401 | YES | 2.8 | 19.5 | 1,130 | 25.0 | N/A | 0.608 | 0.07 | 0.74 |
| 21.50 | 9.52 | 0.26 | 2.70 | silty clay to clay | -10.0 | 1.00 | 6 | 2,580 | 1,675 | 1,925 | 2.98 | N/A | N/A | 0.950 | N/A | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.74 |
| 22.50 | 15.20 | 0.45 | 2.92 | clayey silt to silty clay | -11.0 | 1.00 | 8 | 2,700 | 1,733 | 1,982 | 2.83 | N/A | N/A | 0.948 | N/A | 0.384 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.74 |
| 23.50 | 16.67 | 0.52 | 3.10 | clayey silt to silty clay | -12.0 | 1.00 | 8 | 2,820 | 1,790 | 2,040 | 2.82 | N/A | N/A | 0.945 | N/A | 0.387 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.74 |
| 24.50 | 17.17 | 0.61 | 3.53 | silty clay to clay | -13.0 | 1.00 | 11 | 2,940 | 1,848 | 2,098 | 2.86 | N/A | N/A | 0.943 | N/A | 0.390 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.74 |
| 25.50 | 16.30 | 0.47 | 2.87 | clayey silt to silty clay | -14.0 | 1.00 | 8 | 3,060 | 1,906 | 2,155 | 2.83 | N/A | N/A | 0.941 | N/A | 0.393 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.74 |
| 26.50 | 20.70 | 0.52 | 2.48 | clayey silt to silty clay | -15.0 | 1.00 | 10 | 3,180 | 1,963 | 2,213 | 2.71 | N/A | N/A | 0.938 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.74 |
| 27.50 | 37.23 | 0.52 | 1.39 | silty sand to sandy silt | -16.0 | 1.00 | 12 | 3,300 | 2,021 | 2,270 | 2.35 | 2.13 | 78.80 | 0.936 | 0.997 | 0.397 | 0.126 | 0.405 | YES | 2.8 | 14.4 | 631 | 19.0 | N/A | 1.540 | 0.18 | 0.56 |
| 28.50 | 65.62 | 0.63 | 0.96 | sand to silty sand | -17.0 | 1.00 | 16 | 3,420 | 2,078 | 2,328 | 2.06 | 1.38 | 89.09 | 0.934 | 0.989 | 0.399 | 0.146 | 0.464 | YES | 1.3 | 16.5 | 827 | 18.4 | N/A | 1.591 | 0.19 | 0.37 |
| 29.50 | 89.40 | 0.94 | 1.05 | sand to silty sand | -18.0 | 1.00 | 22 | 3,540 | 2,136 | 2,386 | 1.98 | 1.27 | 110.09 | 0.931 | 0.978 | 0.401 | 0.204 | 0.639 | YES | 1.3 | 21.8 | 1,200 | 23.9 | N/A | 1.105 | 0.13 | 0.23 |
| 30.50 | 147.55 | 1.08 | 0.73 | sand | -19.0 | 1.00 | 30 | 3,660 | 2,194 | 2,443 | 1.71 | 1.05 | 147.38 | 0.926 | 0.965 | 0.402 | 0.378 | 1.166 | YES | 0.0 | 26.7 | 1,200 | 26.7 | N/A | 0.432 | 0.05 | 0.18 |
| 31.50 | 170.69 | 0.99 | 0.58 | sand | -20.0 | 1.00 | 34 | 3,780 | 2,251 | 2,501 | 1.60 | 1.00 | 160.88 | 0.918 | 0.954 | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 30.5 | N/A | 0.090 | 0.01 | 0.17 |
| 32.50 | 200.92 | 1.24 | 0.62 | sand | -21.0 | 1.00 | 40 | 3,900 | 2,309 | 2,558 | 1.57 | 1.00 | 187.00 | 0.909 | 0.944 | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 35.5 | N/A | 0.042 | 0.01 | 0.17 |
| 33.50 | 276.43 | 0.97 | 0.35 | gravelly sand to sand | -22.0 | 1.00 | 46 | 4,020 | 2,366 | 2,616 | 1.31 | 1.00 | 254.13 | 0.901 | 0.935 | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 40.3 | N/A | 0.000 | 0.00 | 0.17 |
| 34.50 | 218.78 | 1.20 | 0.55 | sand | -23.0 | 1.00 | 44 | 4,140 | 2,424 | 2,674 | 1.52 | 1.00 | 198.73 | 0.893 | 0.926 | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | 37.8 | N/A | 0.020 | 0.00 | 0.16 |
| 35.50 | 181.30 | 1.36 | 0.75 | sand | -24.0 | 1.00 | 36 | 4,260 | 2,482 | 2,731 | 1.67 | 1.02 | 165.65 | 0.885 | 0.917 | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | 31.0 | N/A | 0.083 | 0.01 | 0.15 |
| 36.50 | 138.50 | 1.11 | 0.80 | sand | -25.0 | 1.00 | 28 | 4,380 | 2,539 | 2,789 | 1.78 | 1.09 | 134.59 | 0.877 | 0.917 | 0.393 | 0.307 | 0.919 | YES | 0.0 | 23.5 | 1,200 | 23.5 | N/A | 1.128 | 0.14 | 0.02 |
| 37.50 | 119.47 | 0.97 | 0.81 | sand to silty sand | -26.0 | 1.00 | 30 | 4,500 | 2,597 | 2,846 | 1.84 | 1.14 | 119.39 | 0.869 | 0.907 | 0.391 | 0.238 | 0.709 | YES | 1.3 | 26.4 | 1,200 | 28.7 | N/A | 0.114 | 0.01 | 0.00 |
| 38.50 | 220.48 | 1.16 | 0.52 | sand | -27.0 | 1.00 | 44 | 4,620 | 2,654 | 2,904 | 1.52 | 1.00 | 191.38 | 0.861 | 0.893 | 0.389 | N/A | N/A | NO | N/A | N/A | N/A | 36.6 | N/A | 0.031 | 0.00 | 0.00 |
| 39.50 | 540.07 | 1.75 | 0.32 | gravelly sand to sand | -28.0 | 1.00 | 90 | 4,740 | 2,712 | 2,962 | 1.09 | 1.00 | 463.79 | 0.852 | 0.885 | 0.387 | N/A | N/A | NO | N/A | N/A | N/A | 74.0 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 588.00 | 1.72 | 0.29 | gravelly sand to sand | -29.0 | 1.00 | 98 | 4,860 | 2,770 | 3,019 | 1.03 | 1.00 | 499.67 | 0.844 | 0.878 | 0.385 | N/A | N/A | NO | N/A | N/A | N/A | 79.8 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 600.37 | 1.88 | 0.31 | gravelly sand to sand | -30.0 | 1.00 | 100 | 4,980 | 2,827 | 3,077 | 1.05 | 1.00 | 504.96 | 0.836 | 0.871 | 0.383 | N/A | N/A | NO | N/A | N/A | N/A | 80.7 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 572.72 | 2.17 | 0.38 | gravelly sand to sand | -31.0 | 1.00 | 95 | 5,100 | 2,885 | 3,134 | 1.13 | 1.00 | 476.87 | 0.828 | 0.864 | 0.381 | N/A | N/A | NO | N/A | N/A | N/A | 76.2 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 485 |
| avg= | 1,008 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-03 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 10.00 ft |
| GWT Elev. During Test | 8.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow \gg}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 2.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 5.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 11.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.31 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.31 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 33.47 | 0.48 | 1.43 | silty sand to sandy silt | 9.0 | 1.66 | 18 | 60 | 60 | 60 | 1.51 | 1.00 | 319.93 | 0.999 | N/A | 0.260 | N/A | N/A | NO | N/A | N/A | N/A | 42.7 | 0.013 | 0.000 | 0.00 | 0.31 |
| 1.50 | 16.05 | 0.45 | 2.80 | clayey silt to silty clay | 8.0 | 1.00 | 8 | 180 | 180 | 180 | 2.41 | 2.37 | 126.60 | 0.997 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 2.50 | 21.75 | 0.64 | 2.96 | clayey silt to silty clay | 7.0 | 1.00 | 11 | 300 | 300 | 269 | 2.41 | 2.37 | 133.21 | 0.994 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 3.50 | 25.03 | 0.62 | 2.46 | sandy silt to clayey silt | 6.0 | 1.00 | 10 | 420 | 420 | 326 | 2.37 | 2.19 | 119.72 | 0.992 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 25.4 | N/A | N/A | N/A | 0.31 |
| 4.50 | 24.42 | 0.65 | 2.67 | clayey silt to silty clay | 5.0 | 1.00 | 12 | 540 | 540 | 384 | 2.44 | 2.49 | 117.05 | 0.990 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 5.50 | 19.48 | 0.49 | 2.52 | clayey silt to silty clay | 4.0 | 1.00 | 10 | 660 | 629 | 442 | 2.53 | 2.90 | 100.87 | 0.987 | 1.000 | 0.269 | 0.175 | 0.837 | YES | 2.8 | 19.4 | 1,118 | N/A | N/A | 0.000 | 0.00 | 0.31 |
| 6.50 | 27.47 | 0.60 | 2.17 | sandy silt to clayey silt | 3.0 | 1.00 | 11 | 780 | 686 | 499 | 2.38 | 2.25 | 105.38 | 0.985 | 1.000 | 0.291 | 0.189 | 0.834 | YES | 2.8 | 21.5 | 1,200 | 27.4 | N/A | 0.079 | 0.01 | 0.30 |
| 7.50 | 40.65 | 0.90 | 2.22 | sandy silt to clayey silt | 2.0 | 1.00 | 16 | 900 | 744 | 557 | 2.28 | 1.87 | 124.87 | 0.983 | 1.000 | 0.309 | 0.261 | 1.085 | YES | 2.8 | 30.4 | 1,200 | 38.2 | N/A | 0.012 | 0.00 | 0.30 |
| 8.50 | 98.27 | 0.81 | 0.82 | sand to silty sand | 1.0 | 1.00 | 25 | 1,020 | 802 | 614 | 1.71 | 1.05 | 162.26 | 0.980 | 1.000 | 0.324 | N/A | N/A | NO | N/A | N/A | N/A | 46.3 | N/A | 0.000 | 0.00 | 0.30 |
| 9.50 | 91.37 | 0.41 | 0.45 | sand to silty sand | 0.0 | 1.66 | 38 | 1,140 | 859 | 672 | 1.29 | 1.00 | 230.81 | 0.978 | 1.000 | 0.337 | N/A | N/A | NO | N/A | N/A | N/A | 69.9 | N/A | 0.000 | 0.00 | 0.30 |
| 10.50 | 18.09 | 0.50 | 2.72 | clayey silt to silty clay | -1.0 | 1.66 | 15 | 1,260 | 917 | 730 | 2.33 | 2.05 | 90.51 | 0.976 | 1.000 | 0.349 | 0.149 | 0.549 | YES | 2.8 | 27.6 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.30 |
| 11.50 | 8.22 | 0.19 | 2.30 | silty clay to clay | -2.0 | 1.00 | 5 | 1,380 | 974 | 787 | 2.83 | N/A | N/A | 0.973 | N/A | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.30 |
| 12.50 | 7.10 | 0.18 | 2.44 | silty clay to clay | -3.0 | 1.00 | 5 | 1,500 | 1,032 | 845 | 2.92 | N/A | N/A | 0.971 | N/A | 0.367 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.30 |
| 13.50 | 17.28 | 0.22 | 1.28 | sandy silt to clayey silt | -4.0 | 1.00 | 7 | 1,620 | 1,090 | 902 | 2.50 | 2.76 | 64.56 | 0.969 | 1.000 | 0.374 | 0.105 | 0.360 | YES | 2.8 | 13.1 | 518 | 17.4 | N/A | 1.658 | 0.20 | 0.10 |
| 14.50 | 64.92 | 0.37 | 0.57 | sand to silty sand | -5.0 | 1.00 | 16 | 1,740 | 1,147 | 960 | 1.82 | 1.12 | 96.37 | 0.966 | 1.000 | 0.381 | 0.163 | 0.550 | YES | 1.3 | 24.8 | 1,200 | 27.0 | N/A | 0.157 | 0.02 | 0.09 |
| 15.50 | 45.30 | 0.59 | 1.29 | silty sand to sandy silt | -6.0 | 1.00 | 15 | 1,860 | 1,205 | 1,018 | 2.17 | 1.59 | 92.99 | 0.964 | 1.000 | 0.387 | 0.155 | 0.514 | YES | 2.8 | 24.0 | 1,200 | 30.4 | N/A | 0.087 | 0.01 | 0.07 |
| 16.50 | 55.42 | 0.67 | 1.21 | silty sand to sandy silt | -7.0 | 1.66 | 31 | 1,980 | 1,262 | 1,075 | 1.78 | 1.09 | 126.08 | 0.962 | 1.000 | 0.392 | 0.266 | 0.873 | YES | 2.8 | 44.5 | 1,200 | 55.1 | N/A | 0.000 | 0.00 | 0.07 |
| 17.50 | 16.58 | 0.48 | 2.85 | clayey silt to silty clay | -8.0 | 1.00 | 8 | 2,100 | 1,320 | 1,133 | 2.72 | N/A | N/A | 0.959 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 18.50 | 16.17 | 0.33 | 2.03 | clayey silt to silty clay | -9.0 | 1.00 | 8 | 2,220 | 1,378 | 1,190 | 2.65 | N/A | N/A | 0.957 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 19.50 | 18.02 | 0.50 | 2.75 | clayey silt to silty clay | -10.0 | 1.00 | 9 | 2,340 | 1,435 | 1,248 | 2.70 | N/A | N/A | 0.955 | N/A | 0.405 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 20.50 | 23.31 | 0.73 | 3.09 | clayey silt to silty clay | -11.0 | 1.00 | 12 | 2,460 | 1,493 | 1,306 | 2.65 | N/A | N/A | 0.952 | N/A | 0.408 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 21.50 | 23.30 | 0.93 | 3.97 | silty clay to clay | -12.0 | 1.00 | 16 | 2,580 | 1,550 | 1,363 | 2.74 | N/A | N/A | 0.950 | N/A | 0.411 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 22.50 | 16.67 | 0.50 | 2.94 | clayey silt to silty clay | -13.0 | 1.00 | 8 | 2,700 | 1,608 | 1,421 | 2.78 | N/A | N/A | 0.948 | N/A | 0.414 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 23.50 | 19.87 | 0.52 | 2.57 | clayey silt to silty clay | -14.0 | 1.00 | 10 | 2,820 | 1,666 | 1,478 | 2.69 | N/A | N/A | 0.945 | N/A | 0.416 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.07 |
| 24.50 | 31.32 | 0.91 | 2.88 | clayey silt to silty clay | -15.0 | 1.00 | 16 | 2,940 | 1,723 | 1,536 | 2.58 | 3.22 | 108.71 | 0.943 | 1.000 | 0.418 | 0.199 | 0.613 | YES | 2.8 | 20.7 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.07 |
| 25.50 | 99.28 | 1.38 | 1.38 | sand to silty sand | -16.0 | 1.00 | 25 | 3,060 | 1,781 | 1,594 | 1.99 | 1.29 | 135.71 | 0.941 | 1.000 | 0.420 | 0.312 | 0.955 | YES | 1.3 | 29.1 | 1,200 | 31.6 | N/A | 0.085 | 0.01 | 0.06 |
| 26.50 | 191.17 | 1.13 | 0.59 | sand | -17.0 | 1.00 | 38 | 3,180 | 1,838 | 1,651 | 1.54 | 1.00 | 199.39 | 0.938 | 1.000 | 0.422 | N/A | N/A | NO | N/A | N/A | N/A | 42.1 | N/A | 0.000 | 0.00 | 0.06 |
| 27.50 | 254.68 | 1.25 | 0.49 | sand | -18.0 | 1.00 | 51 | 3,300 | 1,896 | 1,709 | 1.39 | 1.00 | 261.57 | 0.936 | 1.000 | 0.424 | N/A | N/A | NO | N/A | N/A | N/A | 55.1 | N/A | 0.000 | 0.00 | 0.06 |
| 28.50 | 340.82 | 1.45 | 0.43 | gravelly sand to sand | -19.0 | 1.00 | 57 | 3,420 | 1,954 | 1,766 | 1.26 | 1.00 | 344.84 | 0.934 | 1.000 | 0.425 | N/A | N/A | NO | N/A | N/A | N/A | 60.4 | N/A | 0.000 | 0.00 | 0.06 |
| 29.50 | 390.80 | 2.63 | 0.67 | gravelly sand to sand | -20.0 | 1.00 | 65 | 3,540 | 2,011 | 1,824 | 1.37 | 1.00 | 389.71 | 0.931 | 0.998 | 0.426 | N/A | N/A | NO | N/A | N/A | N/A | 68.2 | N/A | 0.000 | 0.00 | 0.06 |
| 30.50 | 371.22 | 1.70 | 0.46 | gravelly sand to sand | -21.0 | 1.00 | 62 | 3,660 | 2,069 | 1,882 | 1.27 | 1.00 | 364.99 | 0.926 | 0.987 | 0.426 | N/A | N/A | NO | N/A | N/A | N/A | 63.8 | N/A | 0.000 | 0.00 | 0.06 |
| 31.50 | 282.26 | 0.91 | 0.32 | gravelly sand to sand | -22.0 | 1.00 | 47 | 3,780 | 2,126 | 1,939 | 1.26 | 1.00 | 273.74 | 0.918 | 0.976 | 0.424 | N/A | N/A | NO | N/A | N/A | N/A | 47.8 | N/A | 0.000 | 0.00 | 0.06 |
| 32.50 | 304.52 | 1.36 | 0.45 | gravelly sand to sand | -23.0 | 1.00 | 51 | 3,900 | 2,184 | 1,997 | 1.33 | 1.00 | 291.41 | 0.909 | 0.965 | 0.422 | N/A | N/A | NO | N/A | N/A | N/A | 50.8 | N/A | 0.000 | 0.00 | 0.06 |
| 33.50 | 162.30 | 1.75 | 1.08 | sand | -24.0 | 1.00 | 32 | 4,020 | 2,242 | 2,054 | 1.80 | 1.11 | 169.49 | 0.901 | 0.955 | 0.420 | N/A | N/A | NO | N/A | N/A | N/A | 32.0 | N/A | 0.081 | 0.01 | 0.05 |
| 34.50 | 118.78 | 0.87 | 0.73 | sand | -25.0 | 1.66 | 39 | 4,140 | 2,299 | 2,112 | 1.49 | 1.00 | 183.43 | 0.893 | 0.946 | 0.418 | N/A | N/A | NO | N/A | N/A | N/A | 38.3 | N/A | 0.017 | 0.00 | 0.05 |
| 35.50 | 58.62 | 1.08 | 1.84 | silty sand to sandy silt | -26.0 | 1.00 | 20 | 4,260 | 2,357 | 2,170 | 2.30 | 1.94 | 104.53 | 0.885 | 0.948 | 0.416 | 0.186 | 0.545 | YES | 2.8 | 21.6 | 1,200 | 27.5 | N/A | 0.430 | 0.05 | 0.00 |
| 36.50 | 205.97 | 1.94 | 0.94 | sand | -27.0 | 1.00 | 41 | 4,380 | 2,414 | 2,227 | 1.69 | 1.03 | 193.74 | 0.877 | 0.927 | 0.414 | N/A | N/A | NO | N/A | N/A | N/A | 39.0 | N/A | 0.009 | 0.00 | 0.00 |
| 37.50 | 476.20 | 1.56 | 0.33 | gravelly sand to sand | -28.0 | 1.00 | 79 | 4,500 | 2,472 | 2,285 | 1.12 | 1.00 | 428.33 | 0.869 | 0.919 | 0.411 | N/A | N/A | NO | N/A | N/A | N/A | 74.3 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 498.68 | 1.74 | 0.35 | gravelly sand to sand | -29.0 | 1.00 | 83 | 4,620 | 2,530 | 2,342 | 1.12 | 1.00 | 443.42 | 0.861 | 0.910 | 0.409 | N/A | N/A | NO | N/A | N/A | N/A | 76.8 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 535.92 | 2.03 | 0.38 | gravelly sand to sand | -30.0 | 1.00 | 89 | 4,740 | 2,587 | 2,400 | 1.13 | 1.00 | 471.19 | 0.852 | 0.902 | 0.406 | N/A | N/A | NO | N/A | N/A | N/A | 81.5 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 508.52 | 1.95 | 0.38 | gravelly sand to sand | -31.0 | 1.00 | 85 | 4,860 | 2,645 | 2,458 | 1.15 | 1.00 | 442.21 | 0.844 | 0.894 | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | 76.5 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 492.79 | 1.48 | 0.30 | gravelly sand to sand | -32.0 | 1.00 | 82 | 4,980 | 2,702 | 2,515 | 1.09 | 1.00 | 423.94 | 0.836 | 0.887 | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 73.2 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 741.82 | 1.03 | 0.14 | gravelly sand to sand | -33.0 | 1.00 | 124 | 5,100 | 2,760 | 2,573 | 0.76 | 1.00 | 631.48 | 0.828 | 0.879 | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 109.0 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 518 |
| avg= | 1,131 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-04 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 4.50 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ $(\sigma_v/\sigma_v')$ $r_d$

+++ FS = $(CRR_{7.5}/CSR)$ MSF $K_\sigma$ $K_{\alpha \text{---}>>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 9.50 ft below ground surface

GWT Depth For Design, Zwd = 9.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 9.00 feet

Earthquake-Induced Settlements:

- Liquefaction-Induced Settlement = 0.37 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.01 inches <--- Dry or Unsaturated Sands

Total: 0.38 inches

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 103.77 | 0.53 | 0.51 | sand | 13.0 | 1.00 | 21 | 60 | 60 | 60 | 1.16 | 1.00 | 599.10 | 0.999 | N/A | 0.260 | N/A | N/A | NO | N/A | N/A | N/A | 35.3 | 0.014 | 0.012 | 0.00 | 0.38 |
| 1.50 | 85.25 | 0.97 | 1.14 | sand to silty sand | 12.0 | 1.00 | 21 | 180 | 180 | 180 | 1.63 | 1.00 | 284.17 | 0.997 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | 40.5 | 0.022 | 0.000 | 0.00 | 0.38 |
| 2.50 | 69.77 | 0.95 | 1.36 | silty sand to sandy silt | 11.0 | 1.00 | 23 | 300 | 300 | 300 | 1.82 | 1.12 | 202.06 | 0.994 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 52.4 | 0.027 | 0.000 | 0.00 | 0.38 |
| 3.50 | 75.55 | 0.94 | 1.24 | sand to silty sand | 10.0 | 1.00 | 19 | 420 | 420 | 420 | 1.82 | 1.12 | 184.33 | 0.992 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 36.2 | 0.035 | 0.030 | 0.00 | 0.38 |
| 4.50 | 38.77 | 0.52 | 1.34 | silty sand to sandy silt | 9.0 | 1.66 | 21 | 540 | 540 | 540 | 1.78 | 1.09 | 135.06 | 0.990 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 48.6 | 0.036 | 0.000 | 0.00 | 0.38 |
| 5.50 | 15.07 | 0.44 | 2.89 | clayey silt to silty clay | 8.0 | 1.00 | 8 | 660 | 660 | 660 | 2.57 | 3.13 | 108.15 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.38 |
| 6.50 | 26.22 | 0.70 | 2.65 | sandy silt to clayey silt | 7.0 | 1.00 | 10 | 780 | 780 | 780 | 2.48 | 2.65 | 111.37 | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | 25.2 | N/A | N/A | N/A | 0.38 |
| 7.50 | 18.08 | 0.49 | 2.69 | clayey silt to silty clay | 6.0 | 1.00 | 9 | 900 | 900 | 900 | 2.56 | 3.11 | 102.41 | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.38 |
| 8.50 | 14.42 | 0.47 | 3.28 | silty clay to clay | 5.0 | 1.00 | 10 | 1,020 | 1,020 | 1,020 | 2.73 | N/A | N/A | 0.980 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.38 |
| 9.50 | 16.20 | 0.49 | 2.99 | clayey silt to silty clay | 4.0 | 1.00 | 8 | 1,140 | 1,109 | 1,140 | 2.68 | N/A | N/A | 0.978 | N/A | 0.261 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.38 |
| 10.50 | 19.07 | 0.47 | 2.46 | clayey silt to silty clay | 3.0 | 1.00 | 10 | 1,260 | 1,166 | 1,198 | 2.59 | 3.26 | 93.10 | 0.976 | 1.000 | 0.274 | 0.155 | 0.727 | YES | 2.8 | 15.1 | 691 | N/A | N/A | 0.000 | 0.00 | 0.38 |
| 11.50 | 65.75 | 1.03 | 1.57 | silty sand to sandy silt | 2.0 | 1.00 | 22 | 1,380 | 1,224 | 1,255 | 2.10 | 1.45 | 122.16 | 0.973 | 1.000 | 0.285 | 0.250 | 1.124 | YES | 2.8 | 30.5 | 1,200 | 38.2 | N/A | 0.011 | 0.00 | 0.37 |
| 12.50 | 89.70 | 0.98 | 1.09 | sand to silty sand | 1.0 | 1.66 | 37 | 1,500 | 1,282 | 1,313 | 1.59 | 1.00 | 185.53 | 0.971 | 1.000 | 0.295 | N/A | N/A | NO | N/A | N/A | N/A | 50.5 | N/A | 0.000 | 0.00 | 0.37 |
| 13.50 | 18.75 | 0.47 | 2.48 | clayey silt to silty clay | 0.0 | 1.66 | 16 | 1,620 | 1,339 | 1,370 | 2.36 | 2.15 | 81.53 | 0.969 | 1.000 | 0.305 | 0.130 | 0.550 | YES | 2.8 | 21.6 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.37 |
| 14.50 | 8.22 | 0.19 | 2.26 | silty clay to clay | -1.0 | 1.00 | 5 | 1,740 | 1,397 | 1,428 | 2.93 | N/A | N/A | 0.966 | N/A | 0.313 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 15.50 | 8.70 | 0.21 | 2.39 | silty clay to clay | -2.0 | 1.00 | 6 | 1,860 | 1,454 | 1,486 | 2.93 | N/A | N/A | 0.964 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 |
| 16.50 | 38.43 | 0.24 | 0.62 | silty sand to sandy silt | -3.0 | 1.00 | 13 | 1,980 | 1,512 | 1,543 | 2.09 | 1.44 | 63.66 | 0.962 | 1.000 | 0.327 | 0.104 | 0.408 | YES | 2.8 | 17.4 | 912 | 22.5 | N/A | 0.624 | 0.07 | 0.30 |
| 17.50 | 103.13 | 0.48 | 0.47 | sand | -4.0 | 1.00 | 21 | 2,100 | 1,570 | 1,601 | 1.66 | 1.00 | 116.42 | 0.959 | 1.000 | 0.334 | 0.227 | 0.873 | YES | 0.0 | 23.1 | 1,200 | 23.1 | N/A | 0.482 | 0.06 | 0.24 |
| 18.50 | 93.72 | 0.76 | 0.81 | sand to silty sand | -5.0 | 1.66 | 39 | 2,220 | 1,627 | 1,658 | 1.54 | 1.00 | 172.03 | 0.957 | 1.000 | 0.339 | N/A | N/A | NO | N/A | N/A | N/A | 47.1 | N/A | 0.000 | 0.00 | 0.24 |
| 19.50 | 36.90 | 0.55 | 1.49 | silty sand to sandy silt | -6.0 | 1.66 | 20 | 2,340 | 1,685 | 1,716 | 2.03 | 1.34 | 89.13 | 0.955 | 1.000 | 0.345 | 0.146 | 0.544 | YES | 2.8 | 24.8 | 1,200 | 31.4 | N/A | 0.066 | 0.01 | 0.23 |
| 20.50 | 11.44 | 0.15 | 1.34 | clayey silt to silty clay | -7.0 | 1.00 | 6 | 2,460 | 1,742 | 1,774 | 2.75 | N/A | N/A | 0.952 | N/A | 0.350 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.23 |
| 21.50 | 16.25 | 0.24 | 1.49 | sandy silt to clayey silt | -8.0 | 1.00 | 7 | 2,580 | 1,800 | 1,831 | 2.65 | N/A | N/A | 0.950 | N/A | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.23 |
| 22.50 | 27.62 | 0.66 | 2.39 | sandy silt to clayey silt | -9.0 | 1.00 | 11 | 2,700 | 1,858 | 1,889 | 2.58 | 3.23 | 92.67 | 0.948 | 1.000 | 0.358 | 0.154 | 0.553 | YES | 2.8 | 14.2 | 606 | 18.6 | N/A | 1.494 | 0.18 | 0.06 |
| 23.50 | 33.55 | 1.55 | 4.59 | silty clay to clay | -10.0 | 1.00 | 22 | 2,820 | 1,915 | 1,946 | 2.71 | N/A | N/A | 0.945 | N/A | 0.362 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 |
| 24.50 | 19.15 | 0.82 | 4.28 | clay | -11.0 | 1.00 | 19 | 2,940 | 1,973 | 2,004 | 2.89 | N/A | N/A | 0.943 | N/A | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 |
| 25.50 | 15.55 | 0.52 | 3.34 | silty clay to clay | -12.0 | 1.00 | 10 | 3,060 | 2,030 | 2,062 | 2.90 | N/A | N/A | 0.941 | N/A | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 |
| 26.50 | 43.78 | 0.91 | 2.08 | sandy silt to clayey silt | -13.0 | 1.00 | 18 | 3,180 | 2,088 | 2,119 | 2.41 | 2.34 | 100.45 | 0.938 | 0.987 | 0.372 | 0.174 | 0.595 | YES | 2.8 | 19.8 | 1,166 | 25.4 | N/A | 0.319 | 0.04 | 0.02 |
| 27.50 | 22.85 | 0.66 | 2.85 | clayey silt to silty clay | -14.0 | 1.00 | 11 | 3,300 | 2,146 | 2,177 | 2.73 | N/A | N/A | 0.936 | N/A | 0.374 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 28.50 | 21.82 | 0.74 | 3.38 | clayey silt to silty clay | -15.0 | 1.00 | 11 | 3,420 | 2,203 | 2,234 | 2.80 | N/A | N/A | 0.934 | N/A | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 29.50 | 34.53 | 1.20 | 3.47 | clayey silt to silty clay | -16.0 | 1.00 | 17 | 3,540 | 2,261 | 2,292 | 2.66 | N/A | N/A | 0.931 | N/A | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 30.50 | 73.55 | 1.57 | 2.13 | silty sand to sandy silt | -17.0 | 1.00 | 25 | 3,660 | 2,318 | 2,350 | 2.26 | 1.83 | 124.94 | 0.926 | 0.949 | 0.380 | 0.261 | 0.838 | YES | 2.8 | 25.4 | 1,200 | 32.1 | N/A | 0.069 | 0.01 | 0.01 |
| 31.50 | 232.09 | 0.90 | 0.39 | sand | -18.0 | 1.00 | 46 | 3,780 | 2,376 | 2,407 | 1.40 | 1.00 | 212.93 | 0.918 | 0.933 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 42.3 | N/A | 0.000 | 0.00 | 0.01 |
| 32.50 | 206.53 | 0.73 | 0.35 | sand | -19.0 | 1.00 | 41 | 3,900 | 2,434 | 2,465 | 1.42 | 1.00 | 187.23 | 0.909 | 0.925 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 37.2 | N/A | 0.025 | 0.00 | 0.01 |
| 33.50 | 202.22 | 1.57 | 0.77 | sand | -20.0 | 1.00 | 40 | 4,020 | 2,491 | 2,522 | 1.65 | 1.00 | 181.25 | 0.901 | 0.916 | 0.378 | N/A | N/A | NO | N/A | N/A | N/A | 36.0 | N/A | 0.035 | 0.00 | 0.00 |
| 34.50 | 390.65 | 1.86 | 0.48 | gravelly sand to sand | -21.0 | 1.00 | 65 | 4,140 | 2,549 | 2,580 | 1.29 | 1.00 | 346.05 | 0.893 | 0.908 | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | 57.3 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 554.55 | 4.29 | 0.77 | gravelly sand to sand | -22.0 | 1.00 | 92 | 4,260 | 2,606 | 2,638 | 1.36 | 1.00 | 485.78 | 0.885 | 0.899 | 0.376 | N/A | N/A | NO | N/A | N/A | N/A | 80.5 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 532.48 | 1.72 | 0.32 | gravelly sand to sand | -23.0 | 1.00 | 89 | 4,380 | 2,664 | 2,695 | 1.09 | 1.00 | 461.37 | 0.877 | 0.892 | 0.375 | N/A | N/A | NO | N/A | N/A | N/A | 76.4 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 488.42 | 1.36 | 0.28 | gravelly sand to sand | -24.0 | 1.00 | 81 | 4,500 | 2,722 | 2,753 | 1.08 | 1.00 | 418.69 | 0.869 | 0.884 | 0.373 | N/A | N/A | NO | N/A | N/A | N/A | 69.4 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 405.65 | 0.83 | 0.21 | gravelly sand to sand | -25.0 | 1.00 | 68 | 4,620 | 2,779 | 2,810 | 1.08 | 1.00 | 344.12 | 0.861 | 0.877 | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | 57.0 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 468.97 | 1.09 | 0.23 | gravelly sand to sand | -26.0 | 1.00 | 78 | 4,740 | 2,837 | 2,868 | 1.05 | 1.00 | 393.77 | 0.852 | 0.870 | 0.370 | N/A | N/A | NO | N/A | N/A | N/A | 65.3 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 516.57 | 2.06 | 0.40 | gravelly sand to sand | -27.0 | 1.00 | 86 | 4,860 | 2,894 | 2,926 | 1.17 | 1.00 | 429.40 | 0.844 | 0.863 | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | 71.2 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 526.49 | 1.66 | 0.32 | gravelly sand to sand | -28.0 | 1.00 | 88 | 4,980 | 2,952 | 2,983 | 1.10 | 1.00 | 433.36 | 0.836 | 0.856 | 0.367 | N/A | N/A | NO | N/A | N/A | N/A | 71.8 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 578.73 | 1.98 | 0.34 | gravelly sand to sand | -29.0 | 1.00 | 96 | 5,100 | 3,010 | 3,041 | 1.10 | 1.00 | 471.78 | 0.828 | 0.849 | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | 78.2 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 596.97 | 2.56 | 0.43 | gravelly sand to sand | -30.0 | 1.00 | 99 | 5,220 | 3,067 | 3,098 | 1.16 | 1.00 | 482.06 | 0.820 | 0.843 | 0.363 | N/A | N/A | NO | N/A | N/A | N/A | 79.9 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 685.75 | 2.03 | 0.30 | gravelly sand to sand | -31.0 | 1.00 | 114 | 5,340 | 3,125 | 3,156 | 1.01 | 1.00 | 548.62 | 0.812 | 0.837 | 0.361 | N/A | N/A | NO | N/A | N/A | N/A | 91.0 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 545.87 | 1.72 | 0.32 | gravelly sand to sand | -32.0 | 1.00 | 91 | 5,460 | 3,182 | 3,214 | 1.10 | 1.00 | 432.74 | 0.804 | 0.830 | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | 71.8 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 506.40 | 1.62 | 0.32 | gravelly sand to sand | -33.0 | 1.00 | 84 | 5,580 | 3,240 | 3,271 | 1.13 | 1.00 | 397.87 | 0.795 | 0.825 | 0.356 | N/A | N/A | NO | N/A | N/A | N/A | 66.0 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 664.88 | 2.00 | 0.30 | gravelly sand to sand | -34.0 | 1.00 | 111 | 5,700 | 3,298 | 3,329 | 1.03 | 1.00 | 517.80 | 0.787 | 0.819 | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | 85.9 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 587.92 | 2.39 | 0.41 | gravelly sand to sand | -35.0 | 1.00 | 98 | 5,820 | 3,355 | 3,386 | 1.16 | 1.00 | 453.92 | 0.779 | 0.813 | 0.351 | N/A | N/A | NO | N/A | N/A | N/A | 75.3 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 709.97 | 1.65 | 0.23 | gravelly sand to sand | -36.0 | 1.00 | 118 | 5,940 | 3,413 | 3,444 | 0.94 | 1.00 | 543.50 | 0.771 | 0.808 | 0.349 | N/A | N/A | NO | N/A | N/A | N/A | 90.2 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

max= 1,200
min= 606
avg= 1,042

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-05 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 3.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha}$ —>> where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | | |
|---|---|---|
| GWT Depth During Test, Zw = | 11.00 | ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 | ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | | |
|---|---|---|---|
| Total Thickness of Liquefiable Soils = | 11.00 | feet | |
| Earthquake-Induced Settlements: | | | |
| - Liquefaction-Induced Settlement = | 0.68 | inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 | inches | <--- Dry or Unsaturated Sands |
| Total: | 0.68 | inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 33.58 | 0.15 | 0.45 | silty sand to sandy silt | 13.0 | 1.00 | 11 | 60 | 60 | 60 | 1.47 | 1.00 | 193.89 | 0.999 | N/A | 0.260 | N/A | N/A | NO | N/A | N/A | N/A | 27.8 | 0.015 | 0.017 | 0.00 | 0.68 |
| 1.50 | 74.03 | 0.83 | 1.12 | sand to silty sand | 12.0 | 1.00 | 19 | 180 | 180 | 180 | 1.67 | 1.01 | 250.34 | 0.997 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | 35.5 | 0.024 | 0.020 | 0.00 | 0.68 |
| 2.50 | 88.45 | 1.39 | 1.57 | silty sand to sandy silt | 11.0 | 1.00 | 29 | 300 | 300 | 300 | 1.80 | 1.11 | 252.96 | 0.994 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 65.1 | 0.025 | 0.000 | 0.00 | 0.68 |
| 3.50 | 91.72 | 1.12 | 1.22 | sand to silty sand | 10.0 | 1.00 | 23 | 420 | 420 | 420 | 1.75 | 1.07 | 215.08 | 0.992 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 43.4 | 0.033 | 0.000 | 0.00 | 0.68 |
| 4.50 | 56.58 | 0.71 | 1.25 | silty sand to sandy silt | 9.0 | 1.00 | 19 | 540 | 540 | 540 | 1.95 | 1.24 | 134.61 | 0.990 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 43.5 | 0.038 | 0.000 | 0.00 | 0.68 |
| 5.50 | 44.13 | 0.44 | 0.99 | silty sand to sandy silt | 8.0 | 1.66 | 24 | 660 | 660 | 660 | 1.69 | 1.03 | 131.21 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 54.7 | 0.038 | 0.000 | 0.00 | 0.68 |
| 6.50 | 12.35 | 0.23 | 1.89 | clayey silt to silty clay | 7.0 | 1.00 | 6 | 780 | 780 | 780 | 2.56 | 3.11 | 77.81 | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.68 |
| 7.50 | 24.78 | 0.67 | 2.71 | clayey silt to silty clay | 6.0 | 1.00 | 12 | 900 | 900 | 900 | 2.52 | 2.90 | 107.02 | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.68 |
| 8.50 | 23.97 | 0.69 | 2.87 | clayey silt to silty clay | 5.0 | 1.00 | 12 | 1,020 | 1,020 | 1,020 | 2.57 | 3.17 | 106.40 | 0.980 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.68 |
| 9.50 | 20.92 | 0.66 | 3.14 | clayey silt to silty clay | 4.0 | 1.00 | 10 | 1,140 | 1,109 | 1,140 | 2.61 | N/A | N/A | 0.978 | N/A | 0.261 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.68 |
| 10.50 | 18.59 | 0.47 | 2.51 | clayey silt to silty clay | 3.0 | 1.00 | 9 | 1,260 | 1,166 | 1,260 | 2.60 | N/A | N/A | 0.976 | N/A | 0.274 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.68 |
| 11.50 | 20.98 | 0.46 | 2.20 | sandy silt to clayey silt | 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,349 | 2.58 | 3.21 | 85.98 | 0.973 | 1.000 | 0.285 | 0.139 | 0.626 | YES | 2.8 | 13.0 | 512 | 17.3 | N/A | 1.445 | 0.17 | 0.51 |
| 12.50 | 35.20 | 0.88 | 2.49 | sandy silt to clayey silt | 1.0 | 1.00 | 14 | 1,500 | 1,282 | 1,406 | 2.44 | 2.50 | 110.15 | 0.971 | 1.000 | 0.295 | 0.204 | 0.888 | YES | 2.8 | 19.6 | 1,143 | 25.1 | N/A | 0.095 | 0.01 | 0.50 |
| 13.50 | 51.87 | 0.97 | 1.86 | silty sand to sandy silt | 0.0 | 1.66 | 29 | 1,620 | 1,339 | 1,464 | 1.93 | 1.22 | 127.87 | 0.969 | 1.000 | 0.305 | 0.274 | 1.157 | YES | 2.8 | 36.3 | 1,200 | 45.2 | N/A | 0.000 | 0.00 | 0.50 |
| 14.50 | 11.78 | 0.30 | 2.54 | clayey silt to silty clay | -1.0 | 1.00 | 6 | 1,740 | 1,397 | 1,522 | 2.82 | N/A | N/A | 0.966 | N/A | 0.313 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.50 |
| 15.50 | 9.55 | 0.18 | 1.84 | clayey silt to silty clay | -2.0 | 1.00 | 5 | 1,860 | 1,454 | 1,579 | 2.84 | N/A | N/A | 0.964 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.50 |
| 16.50 | 12.17 | 0.38 | 3.12 | silty clay to clay | -3.0 | 1.00 | 8 | 1,980 | 1,512 | 1,637 | 2.89 | N/A | N/A | 0.962 | N/A | 0.327 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.50 |
| 17.50 | 31.68 | 0.51 | 1.61 | sandy silt to clayey silt | -4.0 | 1.00 | 13 | 2,100 | 1,570 | 1,694 | 2.40 | 2.31 | 82.57 | 0.959 | 1.000 | 0.334 | 0.132 | 0.510 | YES | 2.8 | 16.6 | 830 | 21.5 | N/A | 1.095 | 0.13 | 0.37 |
| 18.50 | 56.67 | 0.73 | 1.28 | silty sand to sandy silt | -5.0 | 1.00 | 19 | 2,220 | 1,627 | 1,752 | 2.14 | 1.53 | 96.23 | 0.957 | 1.000 | 0.339 | 0.163 | 0.616 | YES | 2.8 | 23.0 | 1,200 | 29.2 | N/A | 0.081 | 0.01 | 0.36 |
| 19.50 | 75.93 | 0.61 | 0.80 | sand to silty sand | -6.0 | 1.00 | 19 | 2,340 | 1,685 | 1,810 | 1.92 | 1.21 | 99.94 | 0.955 | 1.000 | 0.345 | 0.173 | 0.644 | YES | 1.3 | 21.3 | 1,200 | 23.4 | N/A | 0.584 | 0.07 | 0.29 |
| 20.50 | 38.90 | 0.66 | 1.71 | silty sand to sandy silt | -7.0 | 1.66 | 21 | 2,460 | 1,742 | 1,867 | 2.05 | 1.37 | 94.60 | 0.952 | 1.000 | 0.350 | 0.159 | 0.583 | YES | 2.8 | 25.0 | 1,200 | 31.7 | N/A | 0.065 | 0.01 | 0.28 |
| 21.50 | 13.35 | 0.34 | 2.53 | clayey silt to silty clay | -8.0 | 1.00 | 7 | 2,580 | 1,800 | 1,925 | 2.85 | N/A | N/A | 0.950 | N/A | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.28 |
| 22.50 | 21.45 | 0.80 | 3.75 | silty clay to clay | -9.0 | 1.00 | 14 | 2,700 | 1,858 | 1,982 | 2.79 | N/A | N/A | 0.948 | N/A | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.28 |
| 23.50 | 25.98 | 0.89 | 3.41 | clayey silt to silty clay | -10.0 | 1.00 | 13 | 2,820 | 1,915 | 2,040 | 2.71 | N/A | N/A | 0.945 | N/A | 0.362 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.28 |
| 24.50 | 27.83 | 0.61 | 2.18 | sandy silt to clayey silt | -11.0 | 1.00 | 11 | 2,940 | 1,973 | 2,098 | 2.57 | 3.13 | 87.98 | 0.943 | 1.000 | 0.365 | 0.143 | 0.504 | YES | 2.8 | 13.7 | 564 | 18.0 | N/A | 1.572 | 0.19 | 0.09 |
| 25.50 | 25.98 | 0.73 | 2.80 | clayey silt to silty clay | -12.0 | 1.00 | 13 | 3,060 | 2,030 | 2,155 | 2.67 | N/A | N/A | 0.941 | N/A | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.09 |
| 26.50 | 20.57 | 0.69 | 3.34 | clayey silt to silty clay | -13.0 | 1.00 | 10 | 3,180 | 2,088 | 2,213 | 2.81 | N/A | N/A | 0.938 | N/A | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.09 |
| 27.50 | 46.97 | 1.18 | 2.52 | sandy silt to clayey silt | -14.0 | 1.00 | 19 | 3,300 | 2,146 | 2,270 | 2.44 | 2.50 | 113.18 | 0.936 | 0.978 | 0.374 | 0.215 | 0.721 | YES | 2.8 | 20.4 | 1,200 | 26.2 | N/A | 0.184 | 0.02 | 0.07 |
| 28.50 | 84.93 | 1.57 | 1.85 | silty sand to sandy silt | -15.0 | 1.00 | 28 | 3,420 | 2,203 | 2,328 | 2.16 | 1.58 | 127.95 | 0.934 | 0.964 | 0.377 | 0.275 | 0.903 | YES | 2.8 | 29.0 | 1,200 | 36.5 | N/A | 0.031 | 0.00 | 0.06 |
| 29.50 | 139.82 | 1.20 | 0.85 | sand | -16.0 | 1.00 | 28 | 3,540 | 2,261 | 2,386 | 1.78 | 1.09 | 143.56 | 0.931 | 0.955 | 0.379 | 0.355 | 1.149 | YES | 0.0 | 25.6 | 1,200 | 25.6 | N/A | 0.329 | 0.04 | 0.02 |
| 30.50 | 145.62 | 1.52 | 1.05 | sand | -17.0 | 1.00 | 29 | 3,660 | 2,318 | 2,443 | 1.83 | 1.13 | 152.52 | 0.926 | 0.945 | 0.380 | 0.410 | 1.309 | NO | N/A | N/A | N/A | 26.3 | N/A | 0.181 | 0.02 | 0.00 |
| 31.50 | 221.80 | 1.91 | 0.86 | sand | -18.0 | 1.00 | 44 | 3,780 | 2,376 | 2,501 | 1.64 | 1.00 | 202.78 | 0.918 | 0.933 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 39.7 | N/A | 0.003 | 0.00 | 0.00 |
| 32.50 | 380.27 | 0.94 | 0.25 | gravelly sand to sand | -19.0 | 1.00 | 63 | 3,900 | 2,434 | 2,558 | 1.12 | 1.00 | 344.73 | 0.909 | 0.925 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 56.0 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | 474.85 | 2.20 | 0.46 | gravelly sand to sand | -20.0 | 1.00 | 79 | 4,020 | 2,491 | 2,616 | 1.22 | 1.00 | 425.47 | 0.901 | 0.916 | 0.378 | N/A | N/A | NO | N/A | N/A | N/A | 69.2 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | 652.08 | 5.73 | 0.88 | gravelly sand to sand | -21.0 | 1.00 | 109 | 4,140 | 2,549 | 2,674 | 1.36 | 1.00 | 577.63 | 0.893 | 0.908 | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | 94.0 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 520.00 | 2.92 | 0.56 | gravelly sand to sand | -22.0 | 1.66 | 143 | 4,260 | 2,606 | 2,731 | 0.96 | 1.00 | 754.21 | 0.885 | 0.899 | 0.376 | N/A | N/A | NO | N/A | N/A | N/A | 122.8 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 247.58 | 1.47 | 0.59 | sand | -23.0 | 1.00 | 50 | 4,380 | 2,664 | 2,789 | 1.51 | 1.00 | 214.52 | 0.877 | 0.892 | 0.375 | N/A | N/A | NO | N/A | N/A | N/A | 41.9 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 362.73 | 1.50 | 0.41 | gravelly sand to sand | -24.0 | 1.00 | 60 | 4,500 | 2,722 | 2,846 | 1.29 | 1.00 | 310.95 | 0.869 | 0.884 | 0.373 | N/A | N/A | NO | N/A | N/A | N/A | 50.7 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 393.37 | 1.13 | 0.29 | gravelly sand to sand | -25.0 | 1.00 | 66 | 4,620 | 2,779 | 2,904 | 1.17 | 1.00 | 333.70 | 0.861 | 0.877 | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | 54.4 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 431.93 | 1.10 | 0.26 | gravelly sand to sand | -26.0 | 1.00 | 72 | 4,740 | 2,837 | 2,962 | 1.11 | 1.00 | 362.67 | 0.852 | 0.870 | 0.370 | N/A | N/A | NO | N/A | N/A | N/A | 59.2 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 450.02 | 1.24 | 0.28 | gravelly sand to sand | -27.0 | 1.00 | 75 | 4,860 | 2,894 | 3,019 | 1.12 | 1.00 | 374.08 | 0.844 | 0.863 | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | 61.0 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 478.06 | 1.65 | 0.35 | gravelly sand to sand | -28.0 | 1.00 | 80 | 4,980 | 2,952 | 3,077 | 1.16 | 1.00 | 393.50 | 0.836 | 0.856 | 0.367 | N/A | N/A | NO | N/A | N/A | N/A | 64.2 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 555.95 | 1.96 | 0.35 | gravelly sand to sand | -29.0 | 1.00 | 93 | 5,100 | 3,010 | 3,134 | 1.12 | 1.00 | 453.21 | 0.828 | 0.849 | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | 74.0 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 637.50 | 3.09 | 0.49 | gravelly sand to sand | -30.0 | 1.00 | 106 | 5,220 | 3,067 | 3,192 | 1.18 | 1.00 | 514.79 | 0.820 | 0.843 | 0.363 | N/A | N/A | NO | N/A | N/A | N/A | 84.1 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 586.12 | 2.58 | 0.44 | gravelly sand to sand | -31.0 | 1.00 | 98 | 5,340 | 3,125 | 3,250 | 1.18 | 1.00 | 468.91 | 0.812 | 0.837 | 0.361 | N/A | N/A | NO | N/A | N/A | N/A | 76.6 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 645.50 | 2.16 | 0.33 | gravelly sand to sand | -32.0 | 1.00 | 108 | 5,460 | 3,182 | 3,307 | 1.07 | 1.00 | 511.73 | 0.804 | 0.830 | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | 83.7 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 500.82 | 1.61 | 0.32 | gravelly sand to sand | -33.0 | 1.00 | 83 | 5,580 | 3,240 | 3,365 | 1.14 | 1.00 | 393.48 | 0.795 | 0.825 | 0.356 | N/A | N/A | NO | N/A | N/A | N/A | 64.4 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 520.17 | 1.47 | 0.28 | gravelly sand to sand | -34.0 | 1.00 | 87 | 5,700 | 3,298 | 3,422 | 1.09 | 1.00 | 405.10 | 0.787 | 0.819 | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | 66.3 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 545.60 | 2.22 | 0.41 | gravelly sand to sand | -35.0 | 1.00 | 91 | 5,820 | 3,355 | 3,480 | 1.19 | 1.00 | 421.24 | 0.779 | 0.813 | 0.351 | N/A | N/A | NO | N/A | N/A | N/A | 68.9 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 569.57 | 1.44 | 0.25 | gravelly sand to sand | -36.0 | 1.00 | 95 | 5,940 | 3,413 | 3,538 | 1.04 | 1.00 | 436.02 | 0.771 | 0.808 | 0.349 | N/A | N/A | NO | N/A | N/A | N/A | 71.4 | N/A | 0.000 | 0.00 | 0.00 |
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| max= | 1,200 |
| min= | 512 |
| avg= | 1,041 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-06 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | -6.30 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 20.30 ft below ground surface

GWT Depth For Design, Zwd = 9.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 4.00 feet

Earthquake-Induced Settlements:

- Liquefaction-Induced Settlement = 0.36 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.00 inches <--- Dry or Unsaturated Sands

Total: 0.36 inches

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 9.45 | 0.13 | 1.36 | clayey silt to silty clay |
| 6.50 | 11.00 | 0.42 | 3.82 | clay |
| 7.50 | 27.13 | 0.77 | 2.82 | clayey silt to silty clay |
| 8.50 | 23.83 | 0.57 | 2.38 | sandy silt to clayey silt |
| 9.50 | 51.47 | 0.76 | 1.48 | silty sand to sandy silt |
| 10.50 | 44.56 | 0.69 | 1.55 | silty sand to sandy silt |
| 11.50 | 15.75 | 0.42 | 2.64 | clayey silt to silty clay |
| 12.50 | 17.02 | 0.46 | 2.67 | clayey silt to silty clay |
| 13.50 | 21.45 | 0.43 | 2.02 | sandy silt to clayey silt |
| 14.50 | 17.37 | 0.34 | 1.93 | clayey silt to silty clay |
| 15.50 | 8.75 | 0.24 | 2.79 | silty clay to clay |
| 16.50 | 8.83 | 0.21 | 2.34 | silty clay to clay |
| 17.50 | 16.38 | 0.51 | 3.09 | clayey silt to silty clay |
| 18.50 | 35.25 | 0.59 | 1.69 | sandy silt to clayey silt |
| 19.50 | 22.12 | 0.56 | 2.53 | clayey silt to silty clay |
| 20.50 | 13.40 | 0.33 | 2.44 | clayey silt to silty clay |
| 21.50 | 11.22 | 0.38 | 3.39 | silty clay to clay |
| 22.50 | 18.20 | 0.60 | 3.30 | clayey silt to silty clay |
| 23.50 | 33.10 | 1.10 | 3.33 | clayey silt to silty clay |
| 24.50 | 21.28 | 0.78 | 3.65 | silty clay to clay |
| 25.50 | 23.75 | 1.04 | 4.38 | silty clay to clay |
| 26.50 | 20.97 | 0.87 | 4.13 | silty clay to clay |
| 27.50 | 19.47 | 0.77 | 3.94 | silty clay to clay |
| 28.50 | 162.58 | 1.62 | 1.00 | sand |
| 29.50 | 559.58 | 3.22 | 0.58 | gravelly sand to sand |
| 30.50 | 708.05 | 5.51 | 0.78 | gravelly sand to sand |
| 31.50 | 686.50 | 2.89 | 0.42 | gravelly sand to sand |
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**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +** / **RESIDUAL STRENGTH *** / **GROUND SETTLEMENT ****

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.50 | 8.0 | 1.00 | 5 | 660 | 660 | 660 | 2.53 | 2.95 | 63.94 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.36 |
| 6.50 | 7.0 | 1.00 | 11 | 780 | 780 | 780 | 2.79 | N/A | N/A | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.36 |
| 7.50 | 6.0 | 1.00 | 14 | 900 | 900 | 900 | 2.51 | 2.80 | 113.41 | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.36 |
| 8.50 | 5.0 | 1.00 | 10 | 1,020 | 1,020 | 1,020 | 2.52 | 2.89 | 96.44 | 0.980 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | 21.0 | N/A | N/A | N/A | 0.36 |
| 9.50 | 4.0 | 1.00 | 17 | 1,140 | 1,109 | 1,140 | 2.15 | 1.54 | 106.79 | 0.978 | 1.000 | 0.261 | 0.193 | 0.950 | YES | 2.8 | 25.5 | 1,200 | 32.3 | N/A | 0.043 | 0.01 | 0.36 |
| 10.50 | 3.0 | 1.66 | 25 | 1,260 | 1,166 | 1,260 | 1.91 | 1.19 | 115.43 | 0.976 | 1.000 | 0.274 | 0.223 | 1.046 | YES | 2.8 | 33.8 | 1,200 | 42.2 | N/A | 0.000 | 0.00 | 0.36 |
| 11.50 | 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,380 | 2.69 | N/A | N/A | 0.973 | N/A | 0.285 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.36 |
| 12.50 | 1.0 | 1.00 | 9 | 1,500 | 1,282 | 1,500 | 2.68 | N/A | N/A | 0.971 | N/A | 0.295 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.36 |
| 13.50 | 0.0 | 1.00 | 9 | 1,620 | 1,339 | 1,620 | 2.57 | 3.13 | 81.95 | 0.969 | 1.000 | 0.305 | 0.131 | 0.553 | YES | 2.8 | 12.3 | 460 | 16.4 | N/A | 1.638 | 0.20 | 0.16 |
| 14.50 | -1.0 | 1.00 | 9 | 1,740 | 1,397 | 1,740 | 2.61 | N/A | N/A | 0.966 | N/A | 0.313 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 15.50 | -2.0 | 1.00 | 6 | 1,860 | 1,454 | 1,860 | 2.97 | N/A | N/A | 0.964 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 16.50 | -3.0 | 1.00 | 6 | 1,980 | 1,512 | 1,980 | 2.93 | N/A | N/A | 0.962 | N/A | 0.327 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 17.50 | -4.0 | 1.00 | 8 | 2,100 | 1,570 | 2,100 | 2.79 | N/A | N/A | 0.959 | N/A | 0.334 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 18.50 | -5.0 | 1.00 | 14 | 2,220 | 1,627 | 2,220 | 2.38 | 2.23 | 87.05 | 0.957 | 1.000 | 0.339 | 0.141 | 0.535 | YES | 2.8 | 16.2 | 792 | 21.1 | N/A | 1.171 | 0.14 | 0.02 |
| 19.50 | -6.0 | 1.00 | 11 | 2,340 | 1,685 | 2,340 | 2.64 | N/A | N/A | 0.955 | N/A | 0.345 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 20.50 | -7.0 | 1.00 | 7 | 2,460 | 1,742 | 2,448 | 2.83 | N/A | N/A | 0.952 | N/A | 0.350 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 21.50 | -8.0 | 1.00 | 7 | 2,580 | 1,800 | 2,505 | 2.99 | N/A | N/A | 0.950 | N/A | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 22.50 | -9.0 | 1.00 | 9 | 2,700 | 1,858 | 2,563 | 2.81 | N/A | N/A | 0.948 | N/A | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 23.50 | -10.0 | 1.00 | 17 | 2,820 | 1,915 | 2,620 | 2.62 | N/A | N/A | 0.945 | N/A | 0.362 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 24.50 | -11.0 | 1.00 | 14 | 2,940 | 1,973 | 2,678 | 2.80 | N/A | N/A | 0.943 | N/A | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 25.50 | -12.0 | 1.00 | 16 | 3,060 | 2,030 | 2,736 | 2.82 | N/A | N/A | 0.941 | N/A | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 26.50 | -13.0 | 1.00 | 14 | 3,180 | 2,088 | 2,793 | 2.86 | N/A | N/A | 0.938 | N/A | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 27.50 | -14.0 | 1.00 | 13 | 3,300 | 2,146 | 2,851 | 2.88 | N/A | N/A | 0.936 | N/A | 0.374 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.02 |
| 28.50 | -15.0 | 1.00 | 33 | 3,420 | 2,203 | 2,908 | 1.77 | 1.09 | 168.10 | 0.934 | 0.963 | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | 27.0 | N/A | 0.156 | 0.02 | 0.00 |
| 29.50 | -16.0 | 1.00 | 93 | 3,540 | 2,261 | 2,966 | 1.23 | 1.00 | 526.32 | 0.931 | 0.952 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 76.6 | N/A | 0.000 | 0.00 | 0.00 |
| 30.50 | -17.0 | 1.00 | 118 | 3,660 | 2,318 | 3,024 | 1.29 | 1.00 | 657.63 | 0.926 | 0.943 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 96.0 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | -18.0 | 1.00 | 114 | 3,780 | 2,376 | 3,081 | 1.08 | 1.00 | 629.84 | 0.918 | 0.933 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 92.2 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 460 |
| avg= | 913 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-07 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 2.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \longrightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 12.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 5.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.23 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.23 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 5.50 | 17.67 | 0.30 | 1.68 | sandy silt to clayey silt | 8.0 | 1.66 | 12 | 660 | 660 | 660 | 2.15 | 1.55 | 79.14 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 28.9 | N/A | N/A | N/A | 0.23 |
| 6.50 | 6.67 | 0.14 | 2.08 | silty clay to clay | 7.0 | 1.00 | 4 | 780 | 780 | 780 | 2.81 | N/A | N/A | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.23 |
| 7.50 | 17.48 | 0.71 | 4.07 | silty clay to clay | 6.0 | 1.00 | 12 | 900 | 900 | 900 | 2.69 | N/A | N/A | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.23 |
| 8.50 | 28.23 | 0.79 | 2.81 | clayey silt to silty clay | 5.0 | 1.00 | 14 | 1,020 | 1,020 | 1,020 | 2.51 | 2.84 | 112.15 | 0.980 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.23 |
| 9.50 | 23.02 | 0.54 | 2.33 | sandy silt to clayey silt | 4.0 | 1.00 | 9 | 1,140 | 1,109 | 1,140 | 2.54 | 3.00 | 92.73 | 0.978 | 1.000 | 0.261 | 0.154 | 0.758 | YES | 2.8 | 15.0 | 680 | 19.6 | N/A | 0.258 | 0.03 | 0.20 |
| 10.50 | 16.00 | 0.40 | 2.49 | clayey silt to silty clay | 3.0 | 1.00 | 8 | 1,260 | 1,166 | 1,260 | 2.65 | N/A | N/A | 0.976 | N/A | 0.274 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 11.50 | 11.00 | 0.34 | 3.08 | silty clay to clay | 2.0 | 1.00 | 7 | 1,380 | 1,224 | 1,380 | 2.86 | N/A | N/A | 0.973 | N/A | 0.285 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 12.50 | 11.00 | 0.22 | 2.03 | clayey silt to silty clay | 1.0 | 1.00 | 6 | 1,500 | 1,282 | 1,469 | 2.76 | N/A | N/A | 0.971 | N/A | 0.295 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 13.50 | 15.42 | 0.33 | 2.16 | clayey silt to silty clay | 0.0 | 1.00 | 8 | 1,620 | 1,339 | 1,526 | 2.67 | N/A | N/A | 0.969 | N/A | 0.305 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 14.50 | 18.57 | 0.34 | 1.84 | sandy silt to clayey silt | -1.0 | 1.66 | 12 | 1,740 | 1,397 | 1,584 | 2.29 | 1.93 | 70.96 | 0.966 | 1.000 | 0.313 | 0.113 | 0.465 | YES | 2.8 | 16.6 | 835 | 21.6 | N/A | 0.783 | 0.09 | 0.10 |
| 15.50 | 8.82 | 0.17 | 1.92 | clayey silt to silty clay | -2.0 | 1.00 | 4 | 1,860 | 1,454 | 1,642 | 2.87 | N/A | N/A | 0.964 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 16.50 | 9.37 | 0.16 | 1.67 | clayey silt to silty clay | -3.0 | 1.00 | 5 | 1,980 | 1,512 | 1,699 | 2.83 | N/A | N/A | 0.962 | N/A | 0.327 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 17.50 | 13.27 | 0.22 | 1.66 | clayey silt to silty clay | -4.0 | 1.00 | 7 | 2,100 | 1,570 | 1,757 | 2.70 | N/A | N/A | 0.959 | N/A | 0.334 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 18.50 | 40.65 | 0.28 | 0.69 | silty sand to sandy silt | -5.0 | 1.66 | 22 | 2,220 | 1,627 | 1,814 | 1.81 | 1.00 | 74.62 | 0.957 | 1.000 | 0.339 | 0.119 | 0.449 | YES | 2.8 | 26.4 | 1,200 | 33.3 | N/A | 0.051 | 0.01 | 0.10 |
| 19.50 | 17.78 | 0.43 | 2.41 | clayey silt to silty clay | -6.0 | 1.00 | 9 | 2,340 | 1,685 | 1,872 | 2.71 | N/A | N/A | 0.955 | N/A | 0.345 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 20.50 | 13.77 | 0.49 | 3.60 | silty clay to clay | -7.0 | 1.00 | 9 | 2,460 | 1,742 | 1,930 | 2.92 | N/A | N/A | 0.952 | N/A | 0.350 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 21.50 | 12.77 | 0.47 | 3.71 | silty clay to clay | -8.0 | 1.00 | 9 | 2,580 | 1,800 | 1,987 | 2.96 | N/A | N/A | 0.950 | N/A | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 22.50 | 14.80 | 0.54 | 3.66 | silty clay to clay | -9.0 | 1.00 | 10 | 2,700 | 1,858 | 2,045 | 2.91 | N/A | N/A | 0.948 | N/A | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 23.50 | 41.10 | 0.85 | 2.08 | sandy silt to clayey silt | -10.0 | 1.00 | 16 | 2,820 | 1,915 | 2,102 | 2.41 | 2.36 | 99.29 | 0.945 | 1.000 | 0.362 | 0.171 | 0.607 | YES | 2.8 | 18.8 | 1,063 | 24.2 | N/A | 0.609 | 0.07 | 0.03 |
| 24.50 | 22.93 | 0.87 | 3.81 | silty clay to clay | -11.0 | 1.00 | 15 | 2,940 | 1,973 | 2,160 | 2.79 | N/A | N/A | 0.943 | N/A | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.03 |
| 25.50 | 13.23 | 0.49 | 3.71 | silty clay to clay | -12.0 | 1.00 | 9 | 3,060 | 2,030 | 2,218 | 2.99 | N/A | N/A | 0.941 | N/A | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.03 |
| 26.50 | 20.05 | 0.92 | 4.57 | clay | -13.0 | 1.00 | 20 | 3,180 | 2,088 | 2,275 | 2.90 | N/A | N/A | 0.938 | N/A | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.03 |
| 27.50 | 73.20 | 1.35 | 1.85 | silty sand to sandy silt | -14.0 | 1.00 | 24 | 3,300 | 2,146 | 2,333 | 2.21 | 1.68 | 118.82 | 0.936 | 0.975 | 0.374 | 0.236 | 0.790 | YES | 2.8 | 25.4 | 1,200 | 32.1 | N/A | 0.068 | 0.01 | 0.02 |
| 28.50 | 154.32 | 1.11 | 0.72 | sand | -15.0 | 1.00 | 31 | 3,420 | 2,203 | 2,390 | 1.69 | 1.03 | 151.99 | 0.934 | 0.962 | 0.377 | 0.407 | 1.334 | NO | N/A | N/A | N/A | 28.2 | N/A | 0.110 | 0.01 | 0.00 |
| 29.50 | 201.75 | 1.13 | 0.56 | sand | -16.0 | 1.00 | 40 | 3,540 | 2,261 | 2,448 | 1.54 | 1.00 | 189.76 | 0.931 | 0.952 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 36.5 | N/A | 0.031 | 0.00 | 0.00 |
| 30.50 | 295.42 | 1.15 | 0.39 | gravelly sand to sand | -17.0 | 1.00 | 49 | 3,660 | 2,318 | 2,506 | 1.31 | 1.00 | 274.38 | 0.926 | 0.943 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 44.0 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | 276.09 | 1.61 | 0.58 | sand | -18.0 | 1.00 | 55 | 3,780 | 2,376 | 2,563 | 1.45 | 1.00 | 253.30 | 0.918 | 0.933 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 48.8 | N/A | 0.000 | 0.00 | 0.00 |
| 32.50 | 292.65 | 1.33 | 0.45 | gravelly sand to sand | -19.0 | 1.00 | 49 | 3,900 | 2,434 | 2,621 | 1.37 | 1.00 | 265.30 | 0.909 | 0.925 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 42.6 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | 317.98 | 1.77 | 0.56 | gravelly sand to sand | -20.0 | 1.00 | 53 | 4,020 | 2,491 | 2,678 | 1.40 | 1.00 | 284.91 | 0.901 | 0.916 | 0.378 | N/A | N/A | NO | N/A | N/A | N/A | 45.8 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | 366.65 | 1.41 | 0.38 | gravelly sand to sand | -21.0 | 1.00 | 61 | 4,140 | 2,549 | 2,736 | 1.25 | 1.00 | 324.79 | 0.893 | 0.908 | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | 52.2 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 416.12 | 1.80 | 0.43 | gravelly sand to sand | -22.0 | 1.00 | 69 | 4,260 | 2,606 | 2,794 | 1.25 | 1.00 | 364.51 | 0.885 | 0.899 | 0.376 | N/A | N/A | NO | N/A | N/A | N/A | 58.7 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 544.02 | 3.30 | 0.61 | gravelly sand to sand | -23.0 | 1.00 | 91 | 4,380 | 2,664 | 2,851 | 1.28 | 1.00 | 471.37 | 0.877 | 0.892 | 0.375 | N/A | N/A | NO | N/A | N/A | N/A | 75.9 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 622.00 | 3.04 | 0.49 | gravelly sand to sand | -24.0 | 1.00 | 104 | 4,500 | 2,722 | 2,909 | 1.18 | 1.00 | 533.20 | 0.869 | 0.884 | 0.373 | N/A | N/A | NO | N/A | N/A | N/A | 86.0 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 642.33 | 5.78 | 0.90 | gravelly sand to sand | -25.0 | 1.00 | 107 | 4,620 | 2,779 | 2,966 | 1.39 | 1.00 | 544.90 | 0.861 | 0.877 | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | 87.9 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 563.43 | 3.05 | 0.54 | gravelly sand to sand | -26.0 | 1.00 | 94 | 4,740 | 2,837 | 3,024 | 1.24 | 1.00 | 473.09 | 0.852 | 0.870 | 0.370 | N/A | N/A | NO | N/A | N/A | N/A | 76.4 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 459.15 | 1.59 | 0.35 | gravelly sand to sand | -27.0 | 1.00 | 77 | 4,860 | 2,894 | 3,082 | 1.17 | 1.00 | 381.67 | 0.844 | 0.863 | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | 61.6 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 390.20 | 2.24 | 0.57 | gravelly sand to sand | -28.0 | 1.00 | 65 | 4,980 | 2,952 | 3,139 | 1.38 | 1.00 | 321.18 | 0.836 | 0.856 | 0.367 | N/A | N/A | NO | N/A | N/A | N/A | 51.9 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 610.42 | 4.63 | 0.76 | gravelly sand to sand | -29.0 | 1.00 | 102 | 5,100 | 3,010 | 3,197 | 1.35 | 1.00 | 497.61 | 0.828 | 0.849 | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | 80.5 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 536.42 | 2.50 | 0.47 | gravelly sand to sand | -30.0 | 1.00 | 89 | 5,220 | 3,067 | 3,254 | 1.22 | 1.00 | 433.16 | 0.820 | 0.843 | 0.363 | N/A | N/A | NO | N/A | N/A | N/A | 70.1 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 465.87 | 2.45 | 0.53 | gravelly sand to sand | -31.0 | 1.00 | 78 | 5,340 | 3,125 | 3,312 | 1.30 | 1.00 | 372.71 | 0.812 | 0.837 | 0.361 | N/A | N/A | NO | N/A | N/A | N/A | 60.3 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 469.73 | 3.37 | 0.72 | gravelly sand to sand | -32.0 | 1.00 | 78 | 5,460 | 3,182 | 3,370 | 1.40 | 1.00 | 372.39 | 0.804 | 0.830 | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | 60.3 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 641.13 | 3.10 | 0.48 | gravelly sand to sand | -33.0 | 1.00 | 107 | 5,580 | 3,240 | 3,427 | 1.19 | 1.00 | 503.73 | 0.795 | 0.825 | 0.356 | N/A | N/A | NO | N/A | N/A | N/A | 81.6 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 653.83 | 3.45 | 0.53 | gravelly sand to sand | -34.0 | 1.00 | 109 | 5,700 | 3,298 | 3,485 | 1.21 | 1.00 | 509.20 | 0.787 | 0.819 | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | 82.6 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 524.28 | 4.28 | 0.82 | gravelly sand to sand | -35.0 | 1.00 | 87 | 5,820 | 3,355 | 3,542 | 1.42 | 1.00 | 404.79 | 0.779 | 0.813 | 0.351 | N/A | N/A | NO | N/A | N/A | N/A | 65.7 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 551.02 | 4.84 | 0.88 | gravelly sand to sand | -36.0 | 1.00 | 92 | 5,940 | 3,413 | 3,600 | 1.44 | 1.00 | 421.82 | 0.771 | 0.808 | 0.349 | N/A | N/A | NO | N/A | N/A | N/A | 68.5 | N/A | 0.000 | 0.00 | 0.00 |
| 50.50 | 604.58 | 3.46 | 0.57 | gravelly sand to sand | -37.0 | 1.00 | 101 | 6,060 | 3,470 | 3,658 | 1.27 | 1.00 | 458.97 | 0.763 | 0.802 | 0.346 | N/A | N/A | NO | N/A | N/A | N/A | 74.5 | N/A | 0.000 | 0.00 | 0.00 |
| 51.50 | 675.42 | 4.87 | 0.72 | gravelly sand to sand | -38.0 | 1.00 | 113 | 6,180 | 3,528 | 3,715 | 1.32 | 1.00 | 508.54 | 0.755 | 0.797 | 0.344 | N/A | N/A | NO | N/A | N/A | N/A | 82.6 | N/A | 0.000 | 0.00 | 0.00 |
| 52.50 | 520.21 | 6.02 | 1.16 | sand | -39.0 | 1.00 | 104 | 6,300 | 3,586 | 3,773 | 1.56 | 1.00 | 388.53 | 0.747 | 0.792 | 0.341 | N/A | N/A | NO | N/A | N/A | N/A | 75.8 | N/A | 0.000 | 0.00 | 0.00 |
| 53.50 | 608.55 | 4.25 | 0.70 | gravelly sand to sand | -40.0 | 1.00 | 101 | 6,420 | 3,643 | 3,830 | 1.34 | 1.00 | 450.89 | 0.739 | 0.787 | 0.338 | N/A | N/A | NO | N/A | N/A | N/A | 73.3 | N/A | 0.000 | 0.00 | 0.00 |
| 54.50 | 528.70 | 5.28 | 1.00 | sand | -41.0 | 1.00 | 106 | 6,540 | 3,701 | 3,888 | 1.51 | 1.00 | 388.67 | 0.730 | 0.782 | 0.336 | N/A | N/A | NO | N/A | N/A | N/A | 75.8 | N/A | 0.000 | 0.00 | 0.00 |
| 55.50 | 682.62 | 4.38 | 0.64 | gravelly sand to sand | -42.0 | 1.00 | 114 | 6,660 | 3,758 | 3,946 | 1.29 | 1.00 | 497.96 | 0.722 | 0.777 | 0.333 | N/A | N/A | NO | N/A | N/A | N/A | 81.0 | N/A | 0.000 | 0.00 | 0.00 |
| 56.50 | 605.00 | 3.28 | 0.54 | gravelly sand to sand | -43.0 | 1.00 | 101 | 6,780 | 3,816 | 4,003 | 1.27 | 1.00 | 438.00 | 0.714 | 0.772 | 0.330 | N/A | N/A | NO | N/A | N/A | N/A | 71.3 | N/A | 0.000 | 0.00 | 0.00 |
| 57.50 | 479.98 | 3.79 | 0.79 | gravelly sand to sand | -44.0 | 1.00 | 80 | 6,900 | 3,874 | 4,061 | 1.46 | 1.00 | 344.89 | 0.706 | 0.768 | 0.327 | N/A | N/A | NO | N/A | N/A | N/A | 56.1 | N/A | 0.000 | 0.00 | 0.00 |
| 58.50 | 421.85 | 5.01 | 1.19 | sand | -45.0 | 1.00 | 84 | 7,020 | 3,931 | 4,118 | 1.63 | 1.00 | 300.89 | 0.698 | 0.763 | 0.324 | N/A | N/A | NO | N/A | N/A | N/A | 58.8 | N/A | 0.000 | 0.00 | 0.00 |
| 59.50 | 411.82 | 3.85 | 0.94 | sand | -46.0 | 1.00 | 82 | 7,140 | 3,989 | 4,176 | 1.56 | 1.00 | 291.61 | 0.690 | 0.759 | 0.321 | N/A | N/A | NO | N/A | N/A | N/A | 57.0 | N/A | 0.000 | 0.00 | 0.00 |
| 60.50 | 468.05 | 3.21 | 0.69 | gravelly sand to sand | -47.0 | 1.00 | 78 | 7,260 | 4,046 | 4,234 | 1.43 | 1.00 | 329.06 | 0.682 | 0.754 | 0.318 | N/A | N/A | NO | N/A | N/A | N/A | 53.6 | N/A | 0.000 | 0.00 | 0.00 |
| 61.50 | 488.12 | 4.05 | 0.83 | gravelly sand to sand | -48.0 | 1.00 | 81 | 7,380 | 4,104 | 4,291 | 1.48 | 1.00 | 340.75 | 0.673 | 0.750 | 0.315 | N/A | N/A | NO | N/A | N/A | N/A | 55.5 | N/A | 0.000 | 0.00 | 0.00 |
| 62.50 | 511.93 | 4.13 | 0.81 | gravelly sand to sand | -49.0 | 1.00 | 85 | 7,500 | 4,162 | 4,349 | 1.46 | 1.00 | 354.89 | 0.665 | 0.746 | 0.312 | N/A | N/A | NO | N/A | N/A | N/A | 57.9 | N/A | 0.000 | 0.00 | 0.00 |
| 63.50 | 427.88 | 4.10 | 0.96 | sand | -50.0 | 1.00 | 86 | 7,620 | 4,219 | 4,406 | 1.57 | 1.00 | 294.60 | 0.657 | 0.742 | 0.309 | N/A | N/A | NO | N/A | N/A | N/A | 57.7 | N/A | 0.000 | 0.00 | 0.00 |
| 64.50 | 490.93 | 5.00 | 1.02 | sand | -51.0 | 1.00 | 98 | 7,740 | 4,277 | 4,464 | 1.55 | 1.00 | 335.72 | 0.649 | 0.738 | 0.305 | N/A | N/A | NO | N/A | N/A | N/A | 65.7 | N/A | 0.000 | 0.00 | 0.00 |
| 65.50 | 564.30 | 4.75 | 0.84 | gravelly sand to sand | -52.0 | 1.00 | 94 | 7,860 | 4,334 | 4,522 | 1.45 | 1.00 | 383.32 | 0.641 | 0.734 | 0.302 | N/A | N/A | NO | N/A | N/A | N/A | 62.6 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 680 |
| avg= | 995 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-08 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 8.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ $(\sigma_v/\sigma_v')$ $r_d$

+++ FS = $(CRR_{7.5}/CSR)$ MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 6.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 3.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.22 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.22 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 0.50 | 100.55 | 0.84 | 0.84 | sand to silty sand |
| 1.50 | 127.15 | 1.12 | 0.88 | sand to silty sand |
| 2.50 | 96.10 | 0.90 | 0.94 | sand to silty sand |
| 3.50 | 50.65 | 0.61 | 1.21 | silty sand to sandy silt |
| 4.50 | 23.32 | 0.24 | 1.04 | sandy silt to clayey silt |
| 5.50 | 18.83 | 0.18 | 0.97 | sandy silt to clayey silt |
| 6.50 | 9.42 | 0.30 | 3.19 | silty clay to clay |
| 7.50 | 21.03 | 0.87 | 4.13 | silty clay to clay |
| 8.50 | 21.23 | 0.52 | 2.44 | clayey silt to silty clay |
| 9.50 | 13.28 | 0.29 | 2.21 | clayey silt to silty clay |
| 10.50 | 14.10 | 0.36 | 2.59 | clayey silt to silty clay |
| 11.50 | 11.97 | 0.37 | 3.07 | silty clay to clay |
| 12.50 | 9.47 | 0.27 | 2.83 | silty clay to clay |
| 13.50 | 11.03 | 0.25 | 2.23 | clayey silt to silty clay |
| 14.50 | 10.48 | 0.21 | 1.98 | clayey silt to silty clay |
| 15.50 | 9.72 | 0.19 | 1.92 | clayey silt to silty clay |
| 16.50 | 10.58 | 0.21 | 1.99 | clayey silt to silty clay |
| 17.50 | 22.05 | 0.60 | 2.74 | clayey silt to silty clay |
| 18.50 | 20.73 | 0.39 | 1.87 | sandy silt to clayey silt |
| 19.50 | 10.17 | 0.29 | 2.91 | silty clay to clay |
| 20.50 | 11.79 | 0.39 | 3.33 | silty clay to clay |
| 21.50 | 23.73 | 0.68 | 2.88 | clayey silt to silty clay |
| 22.50 | 20.55 | 0.76 | 3.74 | silty clay to clay |
| 23.50 | 14.70 | 0.67 | 4.56 | clay |
| 24.50 | 13.03 | 0.38 | 2.94 | silty clay to clay |
| 25.50 | 30.22 | 0.76 | 2.51 | sandy silt to clayey silt |
| 26.50 | 59.30 | 0.97 | 1.64 | silty sand to sandy silt |
| 27.50 | 157.37 | 0.75 | 0.48 | sand |
| 28.50 | 259.50 | 0.75 | 0.29 | gravelly sand to sand |
| 29.50 | 380.13 | 3.52 | 0.93 | sand |
| 30.50 | 456.05 | 3.58 | 0.79 | gravelly sand to sand |
| 31.50 | 479.36 | 1.62 | 0.34 | gravelly sand to sand |
| 32.50 | 475.63 | 2.21 | 0.46 | gravelly sand to sand |
| 33.50 | 578.03 | 2.17 | 0.38 | gravelly sand to sand |
| | | | | #N/A |
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| | | | | #N/A |

**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.50 | 13.0 | 1.00 | 25 | 60 | 60 | 60 | 1.34 | 1.00 | 580.53 | 0.999 | N/A | 0.260 | N/A | N/A | NO |
| 1.50 | 12.0 | 1.00 | 32 | 180 | 180 | 180 | 1.44 | 1.00 | 423.83 | 0.997 | N/A | 0.259 | N/A | N/A | NO |
| 2.50 | 11.0 | 1.00 | 24 | 300 | 300 | 300 | 1.60 | 1.00 | 248.13 | 0.994 | N/A | 0.258 | N/A | N/A | NO |
| 3.50 | 10.0 | 1.66 | 28 | 420 | 420 | 420 | 1.62 | 1.00 | 183.00 | 0.992 | N/A | 0.258 | N/A | N/A | NO |
| 4.50 | 9.0 | 1.00 | 9 | 540 | 540 | 540 | 2.20 | 1.67 | 74.94 | 0.990 | N/A | 0.257 | N/A | N/A | NO |
| 5.50 | 8.0 | 1.00 | 8 | 660 | 660 | 660 | 2.30 | 1.95 | 63.90 | 0.987 | N/A | 0.257 | N/A | N/A | NO |
| 6.50 | 7.0 | 1.00 | 6 | 780 | 780 | 749 | 2.80 | N/A | N/A | 0.985 | N/A | 0.256 | N/A | N/A | NO |
| 7.50 | 6.0 | 1.00 | 14 | 900 | 900 | 806 | 2.64 | N/A | N/A | 0.983 | N/A | 0.255 | N/A | N/A | NO |
| 8.50 | 5.0 | 1.00 | 11 | 1,020 | 1,020 | 864 | 2.57 | 3.15 | 93.59 | 0.980 | N/A | 0.255 | N/A | N/A | NO |
| 9.50 | 4.0 | 1.00 | 7 | 1,140 | 1,109 | 922 | 2.67 | N/A | N/A | 0.978 | N/A | 0.261 | N/A | N/A | NO |
| 10.50 | 3.0 | 1.00 | 7 | 1,260 | 1,166 | 979 | 2.71 | N/A | N/A | 0.976 | N/A | 0.274 | N/A | N/A | NO |
| 11.50 | 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,037 | 2.83 | N/A | N/A | 0.973 | N/A | 0.285 | N/A | N/A | NO |
| 12.50 | 1.0 | 1.00 | 6 | 1,500 | 1,282 | 1,094 | 2.90 | N/A | N/A | 0.971 | N/A | 0.295 | N/A | N/A | NO |
| 13.50 | 0.0 | 1.00 | 6 | 1,620 | 1,339 | 1,152 | 2.80 | N/A | N/A | 0.969 | N/A | 0.305 | N/A | N/A | NO |
| 14.50 | -1.0 | 1.00 | 5 | 1,740 | 1,397 | 1,210 | 2.80 | N/A | N/A | 0.966 | N/A | 0.313 | N/A | N/A | NO |
| 15.50 | -2.0 | 1.00 | 5 | 1,860 | 1,454 | 1,267 | 2.84 | N/A | N/A | 0.964 | N/A | 0.320 | N/A | N/A | NO |
| 16.50 | -3.0 | 1.00 | 5 | 1,980 | 1,512 | 1,325 | 2.82 | N/A | N/A | 0.962 | N/A | 0.327 | N/A | N/A | NO |
| 17.50 | -4.0 | 1.00 | 11 | 2,100 | 1,570 | 1,382 | 2.65 | N/A | N/A | 0.959 | N/A | 0.334 | N/A | N/A | NO |
| 18.50 | -5.0 | 1.66 | 14 | 2,220 | 1,627 | 1,440 | 2.28 | 1.90 | 72.32 | 0.957 | 1.000 | 0.339 | 0.115 | 0.436 | YES |
| 19.50 | -6.0 | 1.00 | 7 | 2,340 | 1,685 | 1,498 | 2.97 | N/A | N/A | 0.955 | N/A | 0.345 | N/A | N/A | NO |
| 20.50 | -7.0 | 1.00 | 8 | 2,460 | 1,742 | 1,555 | 2.96 | N/A | N/A | 0.952 | N/A | 0.350 | N/A | N/A | NO |
| 21.50 | -8.0 | 1.00 | 12 | 2,580 | 1,800 | 1,613 | 2.67 | N/A | N/A | 0.950 | N/A | 0.354 | N/A | N/A | NO |
| 22.50 | -9.0 | 1.00 | 14 | 2,700 | 1,858 | 1,670 | 2.80 | N/A | N/A | 0.948 | N/A | 0.358 | N/A | N/A | NO |
| 23.50 | -10.0 | 1.00 | 15 | 2,820 | 1,915 | 1,728 | 2.99 | N/A | N/A | 0.945 | N/A | 0.362 | N/A | N/A | NO |
| 24.50 | -11.0 | 1.00 | 9 | 2,940 | 1,973 | 1,786 | 2.92 | N/A | N/A | 0.943 | N/A | 0.365 | N/A | N/A | NO |
| 25.50 | -12.0 | 1.00 | 12 | 3,060 | 2,030 | 1,843 | 2.58 | 3.22 | 96.57 | 0.941 | 0.996 | 0.369 | 0.164 | 0.569 | YES |
| 26.50 | -13.0 | 1.00 | 20 | 3,180 | 2,088 | 1,901 | 2.24 | 1.76 | 102.30 | 0.938 | 0.986 | 0.372 | 0.180 | 0.612 | YES |
| 27.50 | -14.0 | 1.00 | 31 | 3,300 | 2,146 | 1,958 | 1.57 | 1.00 | 151.93 | 0.936 | 0.972 | 0.374 | 0.406 | 1.356 | NO |
| 28.50 | -15.0 | 1.00 | 43 | 3,420 | 2,203 | 2,016 | 1.27 | 1.00 | 247.24 | 0.934 | 0.962 | 0.377 | N/A | N/A | NO |
| 29.50 | -16.0 | 1.00 | 76 | 3,540 | 2,261 | 2,074 | 1.50 | 1.00 | 357.54 | 0.931 | 0.952 | 0.379 | N/A | N/A | NO |
| 30.50 | -17.0 | 1.00 | 76 | 3,660 | 2,318 | 2,131 | 1.40 | 1.00 | 423.58 | 0.926 | 0.943 | 0.380 | N/A | N/A | NO |
| 31.50 | -18.0 | 1.00 | 80 | 3,780 | 2,376 | 2,189 | 1.12 | 1.00 | 439.80 | 0.918 | 0.933 | 0.380 | N/A | N/A | NO |
| 32.50 | -19.0 | 1.00 | 79 | 3,900 | 2,434 | 2,246 | 1.22 | 1.00 | 431.18 | 0.909 | 0.925 | 0.379 | N/A | N/A | NO |
| 33.50 | -20.0 | 1.00 | 96 | 4,020 | 2,491 | 2,304 | 1.10 | 1.00 | 517.92 | 0.901 | 0.916 | 0.378 | N/A | N/A | NO |

| Soil Depth During Test (ft) | RESIDUAL STRENGTH * SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | GROUND SETTLEMENT ** Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 0.50 | N/A | N/A | N/A | 47.3 | 0.012 | 0.000 | 0.00 | 0.22 |
| 1.50 | N/A | N/A | N/A | 59.1 | 0.020 | 0.000 | 0.00 | 0.22 |
| 2.50 | N/A | N/A | N/A | 45.3 | 0.028 | 0.000 | 0.00 | 0.22 |
| 3.50 | N/A | N/A | N/A | 62.0 | 0.030 | 0.000 | 0.00 | 0.22 |
| 4.50 | N/A | N/A | N/A | 24.0 | N/A | N/A | N/A | 0.22 |
| 5.50 | N/A | N/A | N/A | 20.4 | N/A | N/A | N/A | 0.22 |
| 6.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 7.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 8.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 9.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 10.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 11.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 12.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 13.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 14.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 15.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 16.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 17.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.22 |
| 18.50 | 2.8 | 19.0 | 1,079 | 24.4 | N/A | 0.266 | 0.03 | 0.18 |
| 19.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.18 |
| 20.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.18 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.18 |
| 22.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.18 |
| 23.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.18 |
| 24.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.18 |
| 25.50 | 2.8 | 15.4 | 716 | 20.1 | N/A | 1.371 | 0.16 | 0.02 |
| 26.50 | 2.8 | 23.1 | 1,200 | 29.3 | N/A | 0.091 | 0.01 | 0.01 |
| 27.50 | N/A | N/A | N/A | 31.8 | N/A | 0.071 | 0.01 | 0.00 |
| 28.50 | N/A | N/A | N/A | 43.1 | N/A | 0.000 | 0.00 | 0.00 |
| 29.50 | N/A | N/A | N/A | 74.7 | N/A | 0.000 | 0.00 | 0.00 |
| 30.50 | N/A | N/A | N/A | 73.6 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | N/A | N/A | N/A | 76.4 | N/A | 0.000 | 0.00 | 0.00 |
| 32.50 | N/A | N/A | N/A | 74.8 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | N/A | N/A | N/A | 89.8 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 716 |
| avg= | 998 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-09 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 16.00 ft |
| GWT Elev. During Test | 2.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v$/$\sigma_v$') $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \to >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 14.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 11.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 1.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.01 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.02 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-avg}}$ (tsf) | Average Sleeve Friction $f_{s\text{-avg}}$ (tsf) | Average Friction Ratio $R_{f\text{-avg}}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 5.50 | 104.10 | 0.68 | 0.65 | sand to silty sand | 10.0 | 1.00 | 26 | 660 | 660 | 660 | 1.59 | 1.00 | 181.21 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 48.9 | 0.040 | 0.000 | 0.00 | 0.02 |
| 6.50 | 77.50 | 0.69 | 0.90 | sand to silty sand | 9.0 | 1.66 | 32 | 780 | 780 | 780 | 1.50 | 1.00 | 205.48 | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | 56.3 | 0.041 | 0.000 | 0.00 | 0.02 |
| 7.50 | 34.78 | 0.48 | 1.37 | silty sand to sandy silt | 8.0 | 1.66 | 19 | 900 | 900 | 900 | 1.91 | 1.20 | 103.22 | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | 39.3 | 0.049 | 0.038 | 0.00 | 0.01 |
| 8.50 | 11.33 | 0.15 | 1.32 | clayey silt to silty clay | 7.0 | 1.66 | 9 | 1,020 | 1,020 | 1,020 | 2.34 | 2.10 | 55.08 | 0.980 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 9.50 | 3.95 | 0.06 | 1.39 | sensitive fine grained | 6.0 | 1.00 | 2 | 1,140 | 1,140 | 1,140 | 3.05 | N/A | N/A | 0.978 | N/A | 0.254 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 10.50 | 12.36 | 0.56 | 4.51 | clay | 5.0 | 1.00 | 12 | 1,260 | 1,260 | 1,260 | 2.93 | N/A | N/A | 0.976 | N/A | 0.254 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 11.50 | 16.97 | 0.82 | 4.80 | clay | 4.0 | 1.00 | 17 | 1,380 | 1,349 | 1,380 | 2.85 | N/A | N/A | 0.973 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 12.50 | 11.10 | 0.46 | 4.09 | clay | 3.0 | 1.00 | 11 | 1,500 | 1,406 | 1,500 | 2.97 | N/A | N/A | 0.971 | N/A | 0.269 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 13.50 | 9.50 | 0.27 | 2.78 | silty clay to clay | 2.0 | 1.00 | 6 | 1,620 | 1,464 | 1,620 | 2.94 | N/A | N/A | 0.969 | N/A | 0.279 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 14.50 | 11.13 | 0.33 | 2.99 | silty clay to clay | 1.0 | 1.00 | 7 | 1,740 | 1,522 | 1,709 | 2.91 | N/A | N/A | 0.966 | N/A | 0.287 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 15.50 | 11.32 | 0.35 | 3.09 | silty clay to clay | 0.0 | 1.00 | 8 | 1,860 | 1,579 | 1,766 | 2.92 | N/A | N/A | 0.964 | N/A | 0.295 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 16.50 | 12.85 | 0.43 | 3.35 | silty clay to clay | -1.0 | 1.00 | 9 | 1,980 | 1,637 | 1,824 | 2.91 | N/A | N/A | 0.962 | N/A | 0.302 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 17.50 | 10.00 | 0.27 | 2.65 | silty clay to clay | -2.0 | 1.00 | 7 | 2,100 | 1,694 | 1,882 | 2.95 | N/A | N/A | 0.959 | N/A | 0.309 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 18.50 | 7.47 | 0.17 | 2.20 | silty clay to clay | -3.0 | 1.00 | 5 | 2,220 | 1,752 | 1,939 | 3.03 | N/A | N/A | 0.957 | N/A | 0.315 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 19.50 | 9.23 | 0.20 | 2.13 | clayey silt to silty clay | -4.0 | 1.00 | 5 | 2,340 | 1,810 | 1,997 | 2.95 | N/A | N/A | 0.955 | N/A | 0.321 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 20.50 | 12.19 | 0.28 | 2.31 | clayey silt to silty clay | -5.0 | 1.00 | 6 | 2,460 | 1,867 | 2,054 | 2.87 | N/A | N/A | 0.952 | N/A | 0.326 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 21.50 | 13.57 | 0.25 | 1.84 | clayey silt to silty clay | -6.0 | 1.00 | 7 | 2,580 | 1,925 | 2,112 | 2.78 | N/A | N/A | 0.950 | N/A | 0.331 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 22.50 | 8.60 | 0.27 | 3.14 | clay | -7.0 | 1.00 | 9 | 2,700 | 1,982 | 2,170 | 3.10 | N/A | N/A | 0.948 | N/A | 0.336 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 23.50 | 10.73 | 0.47 | 4.34 | clay | -8.0 | 1.00 | 11 | 2,820 | 2,040 | 2,227 | 3.11 | N/A | N/A | 0.945 | N/A | 0.340 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 24.50 | 23.30 | 0.82 | 3.53 | clayey silt to silty clay | -9.0 | 1.00 | 12 | 2,940 | 2,098 | 2,285 | 2.78 | N/A | N/A | 0.943 | N/A | 0.344 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 25.50 | 24.88 | 1.00 | 4.00 | silty clay to clay | -10.0 | 1.00 | 17 | 3,060 | 2,155 | 2,342 | 2.80 | N/A | N/A | 0.941 | N/A | 0.347 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 26.50 | 19.82 | 0.70 | 3.51 | silty clay to clay | -11.0 | 1.00 | 13 | 3,180 | 2,213 | 2,400 | 2.85 | N/A | N/A | 0.938 | N/A | 0.351 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 27.50 | 16.92 | 0.64 | 3.79 | silty clay to clay | -12.0 | 1.00 | 11 | 3,300 | 2,270 | 2,458 | 2.93 | N/A | N/A | 0.936 | N/A | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 28.50 | 13.93 | 0.45 | 3.21 | silty clay to clay | -13.0 | 1.00 | 9 | 3,420 | 2,328 | 2,515 | 2.97 | N/A | N/A | 0.934 | N/A | 0.357 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 29.50 | 18.62 | 0.54 | 2.88 | clayey silt to silty clay | -14.0 | 1.00 | 9 | 3,540 | 2,386 | 2,573 | 2.84 | N/A | N/A | 0.931 | N/A | 0.359 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 30.50 | 18.38 | 0.52 | 2.82 | clayey silt to silty clay | -15.0 | 1.00 | 9 | 3,660 | 2,443 | 2,630 | 2.85 | N/A | N/A | 0.926 | N/A | 0.361 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 31.50 | 18.39 | 0.40 | 2.18 | clayey silt to silty clay | -16.0 | 1.00 | 9 | 3,780 | 2,501 | 2,688 | 2.79 | N/A | N/A | 0.918 | N/A | 0.361 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 32.50 | 116.57 | 1.05 | 0.90 | sand to silty sand | -17.0 | 1.00 | 29 | 3,900 | 2,558 | 2,746 | 1.88 | 1.17 | 120.35 | 0.909 | 0.912 | 0.360 | 0.242 | 0.787 | YES | 1.3 | 26.2 | 1,200 | 28.6 | N/A | 0.093 | 0.01 | 0.00 |
| 33.50 | 457.20 | 1.89 | 0.41 | gravelly sand to sand | -18.0 | 1.00 | 76 | 4,020 | 2,616 | 2,803 | 1.21 | 1.00 | 399.76 | 0.901 | 0.898 | 0.360 | N/A | N/A | NO | N/A | N/A | N/A | 64.4 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | 454.32 | 1.94 | 0.43 | gravelly sand to sand | -19.0 | 1.00 | 76 | 4,140 | 2,674 | 2,861 | 1.22 | 1.00 | 392.94 | 0.893 | 0.890 | 0.360 | N/A | N/A | NO | N/A | N/A | N/A | 63.3 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 423.93 | 1.62 | 0.38 | gravelly sand to sand | -20.0 | 1.00 | 71 | 4,260 | 2,731 | 2,918 | 1.21 | 1.00 | 362.77 | 0.885 | 0.883 | 0.359 | N/A | N/A | NO | N/A | N/A | N/A | 58.5 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 504.65 | 3.49 | 0.69 | gravelly sand to sand | -21.0 | 1.00 | 84 | 4,380 | 2,789 | 2,976 | 1.35 | 1.00 | 427.36 | 0.877 | 0.875 | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | 69.0 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 501.93 | 3.15 | 0.63 | gravelly sand to sand | -22.0 | 1.00 | 84 | 4,500 | 2,846 | 3,034 | 1.33 | 1.00 | 420.74 | 0.869 | 0.868 | 0.357 | N/A | N/A | NO | N/A | N/A | N/A | 67.9 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 808.70 | 6.56 | 0.81 | gravelly sand to sand | -23.0 | 1.00 | 135 | 4,620 | 2,904 | 3,091 | 1.30 | 1.00 | 671.13 | 0.861 | 0.861 | 0.356 | N/A | N/A | NO | N/A | N/A | N/A | 108.4 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
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|---|---|
| max= | 1,200 |
| min= | 1,200 |
| avg= | 1,200 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-10 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 9.00 ft |
| GWT Elev. During Test | -4.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha\text{---}>>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 13.00 ft below ground surface
GWT Depth For Design, Zwd = 4.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 4.00 feet
Earthquake-Induced Settlements:
- Liquefaction-Induced Settlement = 0.14 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.00 inches <--- Dry or Unsaturated Sands

Total: 0.14 inches

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 18.78 | 0.83 | 4.43 | clay |
| 6.50 | 13.53 | 0.43 | 3.22 | silty clay to clay |
| 7.50 | 9.62 | 0.25 | 2.64 | silty clay to clay |
| 8.50 | 9.00 | 0.28 | 3.12 | silty clay to clay |
| 9.50 | 9.85 | 0.31 | 3.15 | silty clay to clay |
| 10.50 | 13.20 | 0.38 | 2.87 | clayey silt to silty clay |
| 11.50 | 11.82 | 0.35 | 2.93 | silty clay to clay |
| 12.50 | 9.62 | 0.23 | 2.40 | silty clay to clay |
| 13.50 | 11.40 | 0.17 | 1.51 | clayey silt to silty clay |
| 14.50 | 14.87 | 0.34 | 2.33 | clayey silt to silty clay |
| 15.50 | 21.05 | 0.53 | 2.52 | clayey silt to silty clay |
| 16.50 | 10.58 | 0.31 | 2.93 | silty clay to clay |
| 17.50 | 8.95 | 0.38 | 4.24 | clay |
| 18.50 | 18.82 | 0.68 | 3.59 | silty clay to clay |
| 19.50 | 19.38 | 0.71 | 3.65 | silty clay to clay |
| 20.50 | 19.86 | 0.90 | 4.53 | clay |
| 21.50 | 13.25 | 0.52 | 3.94 | clay |
| 22.50 | 23.90 | 0.81 | 3.38 | clayey silt to silty clay |
| 23.50 | 51.67 | 1.58 | 3.05 | sandy silt to clayey silt |
| 24.50 | 54.90 | 1.51 | 2.74 | sandy silt to clayey silt |
| 25.50 | 99.30 | 1.03 | 1.04 | sand to silty sand |
| 26.50 | 258.83 | 0.74 | 0.29 | gravelly sand to sand |
| 27.50 | 474.33 | 2.94 | 0.62 | gravelly sand to sand |
| 28.50 | 435.13 | 1.73 | 0.40 | gravelly sand to sand |
| 29.50 | 542.80 | 2.72 | 0.50 | gravelly sand to sand |
| 30.50 | 660.30 | 2.61 | 0.40 | gravelly sand to sand |
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**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +** / **RESIDUAL STRENGTH *** / **GROUND SETTLEMENT ****

| Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 1.00 | 19 | 660 | 566 | 660 | 2.59 | 3.25 | 157.09 | 0.987 | 1.000 | 0.299 | 0.441 | 1.892 | NO | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.00 | 0.14 |
| 2.0 | 1.00 | 9 | 780 | 624 | 780 | 2.62 | N/A | N/A | 0.985 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 1.0 | 1.00 | 6 | 900 | 682 | 900 | 2.70 | N/A | N/A | 0.983 | N/A | 0.337 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 0.0 | 1.00 | 6 | 1,020 | 739 | 1,020 | 2.80 | N/A | N/A | 0.980 | N/A | 0.352 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -1.0 | 1.00 | 7 | 1,140 | 797 | 1,140 | 2.79 | N/A | N/A | 0.978 | N/A | 0.364 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -2.0 | 1.00 | 7 | 1,260 | 854 | 1,260 | 2.68 | N/A | N/A | 0.976 | N/A | 0.374 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -3.0 | 1.00 | 8 | 1,380 | 912 | 1,380 | 2.74 | N/A | N/A | 0.973 | N/A | 0.383 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -4.0 | 1.00 | 6 | 1,500 | 970 | 1,500 | 2.78 | N/A | N/A | 0.971 | N/A | 0.391 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -5.0 | 1.00 | 6 | 1,620 | 1,027 | 1,589 | 2.62 | N/A | N/A | 0.969 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -6.0 | 1.00 | 7 | 1,740 | 1,085 | 1,646 | 2.64 | N/A | N/A | 0.966 | N/A | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -7.0 | 1.00 | 11 | 1,860 | 1,142 | 1,704 | 2.56 | 3.09 | 98.90 | 0.964 | 1.000 | 0.408 | 0.170 | 0.535 | YES | 2.8 | 14.2 | 609 | N/A | N/A | 0.000 | 0.00 | 0.14 |
| -8.0 | 1.00 | 7 | 1,980 | 1,200 | 1,762 | 2.86 | N/A | N/A | 0.962 | N/A | 0.412 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -9.0 | 1.00 | 9 | 2,100 | 1,258 | 1,819 | 3.04 | N/A | N/A | 0.959 | N/A | 0.416 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -10.0 | 1.00 | 13 | 2,220 | 1,315 | 1,877 | 2.74 | N/A | N/A | 0.957 | N/A | 0.420 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -11.0 | 1.00 | 13 | 2,340 | 1,373 | 1,934 | 2.74 | N/A | N/A | 0.955 | N/A | 0.423 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -12.0 | 1.00 | 20 | 2,460 | 1,430 | 1,992 | 2.81 | N/A | N/A | 0.952 | N/A | 0.426 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -13.0 | 1.00 | 13 | 2,580 | 1,488 | 2,050 | 2.92 | N/A | N/A | 0.950 | N/A | 0.428 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -14.0 | 1.00 | 12 | 2,700 | 1,546 | 2,107 | 2.68 | N/A | N/A | 0.948 | N/A | 0.430 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -15.0 | 1.00 | 21 | 2,820 | 1,603 | 2,165 | 2.42 | 2.41 | 138.93 | 0.945 | 1.000 | 0.432 | 0.329 | 0.979 | YES | 2.8 | 22.7 | 1,200 | 28.8 | N/A | 0.275 | 0.03 | 0.11 |
| -16.0 | 1.00 | 22 | 2,940 | 1,661 | 2,222 | 2.38 | 2.22 | 133.66 | 0.943 | 1.000 | 0.434 | 0.302 | 0.894 | YES | 2.8 | 23.6 | 1,200 | 30.0 | N/A | 0.151 | 0.02 | 0.09 |
| -17.0 | 1.00 | 25 | 3,060 | 1,718 | 2,280 | 1.90 | 1.19 | 127.52 | 0.941 | 1.000 | 0.435 | 0.273 | 0.805 | YES | 1.3 | 24.6 | 1,200 | 26.9 | N/A | 0.759 | 0.09 | 0.00 |
| -18.0 | 1.00 | 43 | 3,180 | 1,776 | 2,338 | 1.23 | 1.00 | 274.67 | 0.938 | 1.000 | 0.437 | N/A | N/A | NO | N/A | N/A | N/A | 39.9 | N/A | 0.001 | 0.00 | 0.00 |
| -19.0 | 1.00 | 79 | 3,300 | 1,834 | 2,395 | 1.28 | 1.00 | 495.39 | 0.936 | 1.000 | 0.438 | N/A | N/A | NO | N/A | N/A | N/A | 72.2 | N/A | 0.000 | 0.00 | 0.00 |
| -20.0 | 1.00 | 73 | 3,420 | 1,891 | 2,453 | 1.16 | 1.00 | 447.47 | 0.934 | 1.000 | 0.439 | N/A | N/A | NO | N/A | N/A | N/A | 65.5 | N/A | 0.000 | 0.00 | 0.00 |
| -21.0 | 1.00 | 90 | 3,540 | 1,949 | 2,510 | 1.17 | 1.00 | 549.88 | 0.931 | 1.000 | 0.440 | N/A | N/A | NO | N/A | N/A | N/A | 80.7 | N/A | 0.000 | 0.00 | 0.00 |
| -22.0 | 1.00 | 110 | 3,660 | 2,006 | 2,568 | 1.05 | 1.00 | 659.25 | 0.926 | 0.999 | 0.439 | N/A | N/A | NO | N/A | N/A | N/A | 97.1 | N/A | 0.000 | 0.00 | 0.00 |

max= 1,200
min= 609
avg= 1,052

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-11 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 12.00 ft |
| GWT Elev. During Test | 7.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = $0.65\ A_{max}\ (\sigma_v/\sigma_v')\ r_d$

+++ FS = $(CRR_{7.5}/CSR)\ MSF\ K_\sigma\ K_{\alpha \rightarrow >}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 5.00 ft below ground surface

GWT Depth For Design, Zwd = 7.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 1.00 feet

Earthquake-Induced Settlements:

- Liquefaction-Induced Settlement = 0.15 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.00 inches <--- Dry or Unsaturated Sands

Total: 0.15 inches

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 0.50 | 28.13 | 0.61 | 2.16 | sandy silt to clayey silt |
| 1.50 | 22.12 | 0.87 | 3.95 | silty clay to clay |
| 2.50 | 12.45 | 0.55 | 4.39 | clay |
| 3.50 | 10.05 | 0.46 | 4.59 | clay |
| 4.50 | 10.63 | 0.58 | 5.41 | clay |
| 5.50 | 8.95 | 0.40 | 4.50 | clay |
| 6.50 | 17.72 | 0.91 | 5.14 | clay |
| 7.50 | 14.50 | 0.80 | 5.48 | clay |
| 8.50 | 11.20 | 0.45 | 4.04 | clay |
| 9.50 | 8.13 | 0.27 | 3.30 | clay |
| 10.50 | 6.50 | 0.22 | 3.48 | clay |
| 11.50 | 6.53 | 0.22 | 3.40 | clay |
| 12.50 | 9.48 | 0.30 | 3.13 | silty clay to clay |
| 13.50 | 9.37 | 0.25 | 2.69 | silty clay to clay |
| 14.50 | 7.33 | 0.16 | 2.23 | silty clay to clay |
| 15.50 | 18.67 | 0.41 | 2.22 | clayey silt to silty clay |
| 16.50 | 13.15 | 0.26 | 1.98 | clayey silt to silty clay |
| 17.50 | 13.00 | 0.33 | 2.55 | clayey silt to silty clay |
| 18.50 | 10.62 | 0.27 | 2.60 | silty clay to clay |
| 19.50 | 10.53 | 0.39 | 3.70 | clay |
| 20.50 | 15.61 | 0.62 | 3.95 | silty clay to clay |
| 21.50 | 31.45 | 1.06 | 3.35 | clayey silt to silty clay |
| 22.50 | 37.02 | 1.58 | 4.26 | silty clay to clay |
| 23.50 | 25.62 | 1.12 | 4.38 | silty clay to clay |
| 24.50 | 16.22 | 0.45 | 2.74 | clayey silt to silty clay |
| 25.50 | 16.88 | 0.36 | 2.12 | clayey silt to silty clay |
| 26.50 | 24.82 | 0.57 | 2.28 | sandy silt to clayey silt |
| 27.50 | 42.58 | 0.53 | 1.25 | silty sand to sandy silt |
| 28.50 | 265.25 | 1.10 | 0.42 | gravelly sand to sand |
| 29.50 | 475.60 | 1.49 | 0.31 | gravelly sand to sand |
| | | | | #N/A |
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| | | | | #N/A |

**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11.0 | 1.00 | 11 | 60 | 60 | 60 | 2.00 | 1.30 | 211.27 | 0.999 | N/A | 0.260 | N/A | N/A | NO |
| 10.0 | 1.00 | 15 | 180 | 180 | 180 | 2.42 | 2.41 | 177.71 | 0.997 | N/A | 0.259 | N/A | N/A | NO |
| 9.0 | 1.00 | 12 | 300 | 300 | 300 | 2.56 | 3.12 | 160.95 | 0.994 | N/A | 0.258 | N/A | N/A | NO |
| 8.0 | 1.00 | 10 | 420 | 420 | 420 | 2.72 | N/A | N/A | 0.992 | N/A | 0.258 | N/A | N/A | NO |
| 7.0 | 1.00 | 11 | 540 | 540 | 540 | 2.82 | N/A | N/A | 0.990 | N/A | 0.257 | N/A | N/A | NO |
| 6.0 | 1.00 | 9 | 660 | 660 | 629 | 2.87 | N/A | N/A | 0.987 | N/A | 0.257 | N/A | N/A | NO |
| 5.0 | 1.00 | 18 | 780 | 780 | 686 | 2.73 | N/A | N/A | 0.985 | N/A | 0.256 | N/A | N/A | NO |
| 4.0 | 1.00 | 15 | 900 | 869 | 744 | 2.84 | N/A | N/A | 0.983 | N/A | 0.265 | N/A | N/A | NO |
| 3.0 | 1.00 | 11 | 1,020 | 926 | 802 | 2.85 | N/A | N/A | 0.980 | N/A | 0.281 | N/A | N/A | NO |
| 2.0 | 1.00 | 8 | 1,140 | 984 | 859 | 2.92 | N/A | N/A | 0.978 | N/A | 0.295 | N/A | N/A | NO |
| 1.0 | 1.00 | 7 | 1,260 | 1,042 | 917 | 3.04 | N/A | N/A | 0.976 | N/A | 0.307 | N/A | N/A | NO |
| 0.0 | 1.00 | 7 | 1,380 | 1,099 | 974 | 3.05 | N/A | N/A | 0.973 | N/A | 0.318 | N/A | N/A | NO |
| -1.0 | 1.00 | 6 | 1,500 | 1,157 | 1,032 | 2.90 | N/A | N/A | 0.971 | N/A | 0.327 | N/A | N/A | NO |
| -2.0 | 1.00 | 6 | 1,620 | 1,214 | 1,090 | 2.88 | N/A | N/A | 0.969 | N/A | 0.336 | N/A | N/A | NO |
| -3.0 | 1.00 | 5 | 1,740 | 1,272 | 1,147 | 2.94 | N/A | N/A | 0.966 | N/A | 0.344 | N/A | N/A | NO |
| -4.0 | 1.00 | 9 | 1,860 | 1,330 | 1,205 | 2.61 | N/A | N/A | 0.964 | N/A | 0.351 | N/A | N/A | NO |
| -5.0 | 1.00 | 7 | 1,980 | 1,387 | 1,262 | 2.72 | N/A | N/A | 0.962 | N/A | 0.357 | N/A | N/A | NO |
| -6.0 | 1.00 | 7 | 2,100 | 1,445 | 1,320 | 2.80 | N/A | N/A | 0.959 | N/A | 0.362 | N/A | N/A | NO |
| -7.0 | 1.00 | 7 | 2,220 | 1,502 | 1,378 | 2.89 | N/A | N/A | 0.957 | N/A | 0.368 | N/A | N/A | NO |
| -8.0 | 1.00 | 11 | 2,340 | 1,560 | 1,435 | 3.00 | N/A | N/A | 0.955 | N/A | 0.372 | N/A | N/A | NO |
| -9.0 | 1.00 | 10 | 2,460 | 1,618 | 1,493 | 2.88 | N/A | N/A | 0.952 | N/A | 0.376 | N/A | N/A | NO |
| -10.0 | 1.00 | 16 | 2,580 | 1,675 | 1,550 | 2.60 | N/A | N/A | 0.950 | N/A | 0.380 | N/A | N/A | NO |
| -11.0 | 1.00 | 25 | 2,700 | 1,733 | 1,608 | 2.63 | N/A | N/A | 0.948 | N/A | 0.384 | N/A | N/A | NO |
| -12.0 | 1.00 | 17 | 2,820 | 1,790 | 1,666 | 2.77 | N/A | N/A | 0.945 | N/A | 0.387 | N/A | N/A | NO |
| -13.0 | 1.00 | 8 | 2,940 | 1,848 | 1,723 | 2.81 | N/A | N/A | 0.943 | N/A | 0.390 | N/A | N/A | NO |
| -14.0 | 1.00 | 8 | 3,060 | 1,906 | 1,781 | 2.73 | N/A | N/A | 0.941 | N/A | 0.393 | N/A | N/A | NO |
| -15.0 | 1.00 | 10 | 3,180 | 1,963 | 1,838 | 2.62 | N/A | N/A | 0.938 | N/A | 0.395 | N/A | N/A | NO |
| -16.0 | 1.00 | 14 | 3,300 | 2,021 | 1,896 | 2.28 | 1.87 | 79.27 | 0.936 | 0.997 | 0.397 | 0.126 | 0.407 | YES |
| -17.0 | 1.00 | 44 | 3,420 | 2,078 | 1,954 | 1.35 | 1.00 | 260.20 | 0.934 | 0.985 | 0.399 | N/A | N/A | NO |
| -18.0 | 1.00 | 79 | 3,540 | 2,136 | 2,011 | 1.08 | 1.00 | 460.21 | 0.931 | 0.974 | 0.401 | N/A | N/A | NO |

| Bottom of Layer Elevation (ft) | RESIDUAL STRENGTH * SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | GROUND SETTLEMENT ** Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 11.0 | N/A | N/A | N/A | 28.0 | N/A | N/A | N/A | 0.15 |
| 10.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 9.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 8.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 7.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 6.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 5.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 4.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 3.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 2.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 1.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 0.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -1.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -2.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -3.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -4.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -5.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -6.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -7.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -8.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -9.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -10.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -11.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -12.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -13.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -14.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -15.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| -16.0 | 2.8 | 17.4 | 912 | 22.5 | N/A | 1.225 | 0.15 | 0.00 |
| -17.0 | N/A | N/A | N/A | 44.7 | N/A | 0.000 | 0.00 | 0.00 |
| -18.0 | N/A | N/A | N/A | 79.0 | N/A | 0.000 | 0.00 | 0.00 |

max= 912

min= 912

avg= 912

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-12 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | -1.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \longrightarrow}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 15.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 3.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.14 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.02 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.15 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 0.50 | 49.63 | 0.89 | 1.79 | silty sand to sandy silt |
| 1.50 | 23.03 | 0.78 | 3.37 | clayey silt to silty clay |
| 2.50 | 49.13 | 0.84 | 1.71 | silty sand to sandy silt |
| 3.50 | 69.33 | 0.57 | 0.83 | sand to silty sand |
| 4.50 | 44.70 | 0.53 | 1.19 | silty sand to sandy silt |
| 5.50 | 37.38 | 0.37 | 1.00 | silty sand to sandy silt |
| 6.50 | 41.75 | 0.32 | 0.77 | silty sand to sandy silt |
| 7.50 | 6.92 | 0.16 | 2.26 | silty clay to clay |
| 8.50 | 8.77 | 0.37 | 4.18 | clay |
| 9.50 | 17.98 | 0.99 | 5.50 | clay |
| 10.50 | 14.50 | 0.71 | 4.90 | clay |
| 11.50 | 7.60 | 0.38 | 4.95 | clay |
| 12.50 | 5.88 | 0.24 | 4.10 | clay |
| 13.50 | 5.18 | 0.17 | 3.28 | clay |
| 14.50 | 8.02 | 0.23 | 2.85 | silty clay to clay |
| 15.50 | 12.27 | 0.33 | 2.68 | clayey silt to silty clay |
| 16.50 | 9.08 | 0.25 | 2.75 | silty clay to clay |
| 17.50 | 10.70 | 0.26 | 2.38 | clayey silt to silty clay |
| 18.50 | 9.17 | 0.16 | 1.73 | clayey silt to silty clay |
| 19.50 | 13.00 | 0.33 | 2.50 | clayey silt to silty clay |
| 20.50 | 12.36 | 0.46 | 3.75 | clay |
| 21.50 | 17.52 | 0.74 | 4.22 | clay |
| 22.50 | 20.67 | 0.66 | 3.19 | clayey silt to silty clay |
| 23.50 | 20.18 | 0.54 | 2.65 | clayey silt to silty clay |
| 24.50 | 21.77 | 0.68 | 3.14 | clayey silt to silty clay |
| 25.50 | 20.32 | 0.75 | 3.69 | silty clay to clay |
| 26.50 | 22.40 | 0.69 | 3.08 | clayey silt to silty clay |
| 27.50 | 93.25 | 1.08 | 1.16 | sand to silty sand |
| 28.50 | 121.28 | 1.17 | 0.96 | sand to silty sand |
| 29.50 | 213.15 | 0.97 | 0.46 | sand |
| 30.50 | 350.87 | 1.63 | 0.46 | gravelly sand to sand |
| 31.50 | 493.11 | 3.09 | 0.63 | gravelly sand to sand |
| 32.50 | 558.93 | 2.88 | 0.52 | gravelly sand to sand |
| 33.50 | 575.72 | 3.33 | 0.58 | gravelly sand to sand |
| 34.50 | 413.05 | 2.28 | 0.55 | gravelly sand to sand |
| 35.50 | 172.18 | 0.86 | 0.50 | sand |
| 36.50 | 274.98 | 1.61 | 0.59 | sand |
| 37.50 | 462.32 | 2.42 | 0.52 | gravelly sand to sand |
| 38.50 | 329.55 | 1.37 | 0.42 | gravelly sand to sand |
| 39.50 | 355.45 | 1.37 | 0.39 | gravelly sand to sand |
| 40.50 | 436.57 | 2.41 | 0.55 | gravelly sand to sand |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
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| | | | | #N/A |
| | | | | #N/A |

| SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 13.0 | 1.66 | 27 | 60 | 60 | 60 | 1.48 | 1.00 | 474.46 | 0.999 | N/A | 0.260 | N/A | N/A | NO | N/A | N/A | N/A | 60.9 | 0.011 | 0.000 | 0.00 | 0.15 |
| 12.0 | 1.00 | 12 | 180 | 180 | 180 | 2.36 | 2.16 | 165.78 | 0.997 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.15 |
| 11.0 | 1.00 | 16 | 300 | 300 | 300 | 2.00 | 1.30 | 164.33 | 0.994 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 38.4 | 0.029 | 0.023 | 0.00 | 0.15 |
| 10.0 | 1.00 | 17 | 420 | 420 | 420 | 1.72 | 1.05 | 159.13 | 0.992 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 33.4 | 0.036 | 0.034 | 0.00 | 0.15 |
| 9.0 | 1.00 | 15 | 540 | 540 | 540 | 2.01 | 1.31 | 113.11 | 0.990 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 35.4 | 0.040 | 0.035 | 0.00 | 0.14 |
| 8.0 | 1.00 | 12 | 660 | 660 | 660 | 2.06 | 1.39 | 90.14 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 30.4 | 0.047 | 0.048 | 0.01 | 0.14 |
| 7.0 | 1.66 | 23 | 780 | 780 | 780 | 1.68 | 1.00 | 110.69 | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | 49.3 | 0.043 | 0.000 | 0.00 | 0.14 |
| 6.0 | 1.00 | 5 | 900 | 900 | 900 | 2.86 | N/A | N/A | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 5.0 | 1.00 | 9 | 1,020 | 1,020 | 1,020 | 2.97 | N/A | N/A | 0.980 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 4.0 | 1.00 | 18 | 1,140 | 1,109 | 1,140 | 2.83 | N/A | N/A | 0.978 | N/A | 0.261 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 3.0 | 1.00 | 15 | 1,260 | 1,166 | 1,260 | 2.88 | N/A | N/A | 0.976 | N/A | 0.274 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,380 | 3.12 | N/A | N/A | 0.973 | N/A | 0.285 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 1.0 | 1.00 | 6 | 1,500 | 1,282 | 1,500 | 3.18 | N/A | N/A | 0.971 | N/A | 0.295 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| 0.0 | 1.00 | 5 | 1,620 | 1,339 | 1,620 | 3.19 | N/A | N/A | 0.969 | N/A | 0.305 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -1.0 | 1.00 | 5 | 1,740 | 1,397 | 1,740 | 2.99 | N/A | N/A | 0.966 | N/A | 0.313 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -2.0 | 1.00 | 6 | 1,860 | 1,454 | 1,829 | 2.83 | N/A | N/A | 0.964 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -3.0 | 1.00 | 6 | 1,980 | 1,512 | 1,886 | 2.96 | N/A | N/A | 0.962 | N/A | 0.327 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -4.0 | 1.00 | 5 | 2,100 | 1,570 | 1,944 | 2.88 | N/A | N/A | 0.959 | N/A | 0.334 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -5.0 | 1.00 | 5 | 2,220 | 1,627 | 2,002 | 2.87 | N/A | N/A | 0.957 | N/A | 0.339 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -6.0 | 1.00 | 7 | 2,340 | 1,685 | 2,059 | 2.84 | N/A | N/A | 0.955 | N/A | 0.345 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -7.0 | 1.00 | 12 | 2,460 | 1,742 | 2,117 | 2.97 | N/A | N/A | 0.952 | N/A | 0.350 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -8.0 | 1.00 | 18 | 2,580 | 1,800 | 2,174 | 2.89 | N/A | N/A | 0.950 | N/A | 0.354 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -9.0 | 1.00 | 10 | 2,700 | 1,858 | 2,232 | 2.76 | N/A | N/A | 0.948 | N/A | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -10.0 | 1.00 | 10 | 2,820 | 1,915 | 2,290 | 2.73 | N/A | N/A | 0.945 | N/A | 0.362 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -11.0 | 1.00 | 11 | 2,940 | 1,973 | 2,347 | 2.75 | N/A | N/A | 0.943 | N/A | 0.365 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -12.0 | 1.00 | 14 | 3,060 | 2,030 | 2,405 | 2.83 | N/A | N/A | 0.941 | N/A | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -13.0 | 1.00 | 11 | 3,180 | 2,088 | 2,462 | 2.75 | N/A | N/A | 0.938 | N/A | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.14 |
| -14.0 | 1.00 | 23 | 3,300 | 2,146 | 2,520 | 1.99 | 1.29 | 115.94 | 0.936 | 0.976 | 0.374 | 0.225 | 0.754 | YES | 1.3 | 22.1 | 1,200 | 24.3 | N/A | 0.909 | 0.11 | 0.03 |
| -15.0 | 1.00 | 30 | 3,420 | 2,203 | 2,578 | 1.86 | 1.15 | 132.84 | 0.934 | 0.963 | 0.377 | 0.298 | 0.979 | YES | 1.3 | 28.0 | 1,200 | 30.5 | N/A | 0.083 | 0.01 | 0.02 |
| -16.0 | 1.00 | 43 | 3,540 | 2,261 | 2,635 | 1.46 | 1.00 | 200.48 | 0.931 | 0.952 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 37.1 | N/A | 0.025 | 0.00 | 0.01 |
| -17.0 | 1.00 | 58 | 3,660 | 2,318 | 2,693 | 1.31 | 1.00 | 325.88 | 0.926 | 0.943 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 50.4 | N/A | 0.000 | 0.00 | 0.01 |
| -18.0 | 1.00 | 82 | 3,780 | 2,376 | 2,750 | 1.30 | 1.00 | 452.42 | 0.918 | 0.933 | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | 70.1 | N/A | 0.000 | 0.00 | 0.01 |
| -19.0 | 1.00 | 93 | 3,900 | 2,434 | 2,808 | 1.21 | 1.00 | 506.70 | 0.909 | 0.925 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 78.6 | N/A | 0.000 | 0.00 | 0.01 |
| -20.0 | 1.00 | 96 | 4,020 | 2,491 | 2,866 | 1.24 | 1.00 | 515.85 | 0.901 | 0.916 | 0.378 | N/A | N/A | NO | N/A | N/A | N/A | 80.2 | N/A | 0.000 | 0.00 | 0.01 |
| -21.0 | 1.66 | 114 | 4,140 | 2,549 | 2,923 | 1.01 | 1.00 | 605.82 | 0.893 | 0.908 | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | 94.3 | N/A | 0.000 | 0.00 | 0.01 |
| -22.0 | 1.00 | 34 | 4,260 | 2,606 | 2,981 | 1.59 | 1.00 | 150.83 | 0.885 | 0.900 | 0.376 | 0.399 | 1.227 | YES | 0.0 | 28.2 | 1,200 | 28.2 | N/A | 0.110 | 0.01 | 0.00 |
| -23.0 | 1.00 | 55 | 4,380 | 2,664 | 3,038 | 1.48 | 1.00 | 238.26 | 0.877 | 0.892 | 0.375 | N/A | N/A | NO | N/A | N/A | N/A | 44.6 | N/A | 0.000 | 0.00 | 0.00 |
| -24.0 | 1.00 | 77 | 4,500 | 2,722 | 3,096 | 1.28 | 1.00 | 396.32 | 0.869 | 0.884 | 0.373 | N/A | N/A | NO | N/A | N/A | N/A | 61.9 | N/A | 0.000 | 0.00 | 0.00 |
| -25.0 | 1.00 | 55 | 4,620 | 2,779 | 3,154 | 1.33 | 1.00 | 279.56 | 0.861 | 0.877 | 0.372 | N/A | N/A | NO | N/A | N/A | N/A | 43.7 | N/A | 0.000 | 0.00 | 0.00 |
| -26.0 | 1.00 | 59 | 4,740 | 2,837 | 3,211 | 1.28 | 1.00 | 298.46 | 0.852 | 0.870 | 0.370 | N/A | N/A | NO | N/A | N/A | N/A | 46.8 | N/A | 0.000 | 0.00 | 0.00 |
| -27.0 | 1.00 | 73 | 4,860 | 2,894 | 3,269 | 1.33 | 1.00 | 362.90 | 0.844 | 0.863 | 0.369 | N/A | N/A | NO | N/A | N/A | N/A | 56.9 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 1,200 |
| avg= | 1,200 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-13 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 13.00 ft |
| GWT Elev. During Test | -0.10 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ $(\sigma_v/\sigma_v')$ $r_d$

+++ FS = $(CRR_{7.5}/CSR)$ MSF $K_\sigma$ $K_{\alpha}$ —>> where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 13.10 ft below ground surface

GWT Depth For Design, Zwd = 8.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 5.00 feet

Earthquake-Induced Settlements:

- Liquefaction-Induced Settlement = 0.97 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.01 inches <--- Dry or Unsaturated Sands

Total: 0.98 inches

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-avg}}$ (tsf) | Average Sleeve Friction $f_{s\text{-avg}}$ (tsf) | Average Friction Ratio $R_{f\text{-avg}}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 28.95 | 0.47 | 1.61 | sandy silt to clayey silt | 12.0 | 1.00 | 12 | 60 | 60 | 60 | 1.89 | 1.18 | 197.84 | 0.999 | N/A | 0.260 | N/A | N/A | NO | N/A | N/A | N/A | 28.6 | N/A | N/A | N/A | 0.98 |
| 1.50 | 51.27 | 0.31 | 0.61 | sand to silty sand | 11.0 | 1.00 | 13 | 180 | 180 | 180 | 1.59 | 1.00 | 170.89 | 0.997 | N/A | 0.259 | N/A | N/A | NO | N/A | N/A | N/A | 25.3 | 0.026 | 0.034 | 0.00 | 0.98 |
| 2.50 | 100.75 | 0.47 | 0.47 | sand | 10.0 | 1.00 | 20 | 300 | 300 | 300 | 1.38 | 1.00 | 260.14 | 0.994 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 34.3 | 0.031 | 0.028 | 0.00 | 0.97 |
| 3.50 | 120.30 | 0.62 | 0.51 | sand | 9.0 | 1.00 | 24 | 420 | 420 | 420 | 1.40 | 1.00 | 262.52 | 0.992 | N/A | 0.258 | N/A | N/A | NO | N/A | N/A | N/A | 40.9 | 0.034 | 0.000 | 0.00 | 0.97 |
| 4.50 | 66.72 | 0.49 | 0.73 | sand to silty sand | 8.0 | 1.66 | 28 | 540 | 540 | 540 | 1.43 | 1.00 | 212.59 | 0.990 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 51.7 | 0.035 | 0.000 | 0.00 | 0.97 |
| 5.50 | 22.08 | 0.23 | 1.02 | sandy silt to clayey silt | 7.0 | 1.66 | 15 | 660 | 660 | 660 | 1.95 | 1.24 | 78.92 | 0.987 | N/A | 0.257 | N/A | N/A | NO | N/A | N/A | N/A | 34.8 | N/A | N/A | N/A | 0.97 |
| 6.50 | 8.15 | 0.10 | 1.26 | clayey silt to silty clay | 6.0 | 1.00 | 4 | 780 | 780 | 780 | 2.62 | N/A | N/A | 0.985 | N/A | 0.256 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 7.50 | 16.80 | 0.64 | 3.82 | silty clay to clay | 5.0 | 1.00 | 11 | 900 | 900 | 900 | 2.69 | N/A | N/A | 0.983 | N/A | 0.255 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 8.50 | 18.45 | 0.69 | 3.74 | silty clay to clay | 4.0 | 1.00 | 12 | 1,020 | 989 | 1,020 | 2.68 | N/A | N/A | 0.980 | N/A | 0.263 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 9.50 | 13.65 | 0.40 | 2.94 | clayey silt to silty clay | 3.0 | 1.00 | 7 | 1,140 | 1,046 | 1,140 | 2.73 | N/A | N/A | 0.978 | N/A | 0.277 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 10.50 | 8.40 | 0.28 | 3.31 | clay | 2.0 | 1.00 | 8 | 1,260 | 1,104 | 1,260 | 2.95 | N/A | N/A | 0.976 | N/A | 0.289 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 11.50 | 6.43 | 0.25 | 3.78 | clay | 1.0 | 1.00 | 6 | 1,380 | 1,162 | 1,380 | 3.10 | N/A | N/A | 0.973 | N/A | 0.301 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 12.50 | 6.98 | 0.17 | 2.38 | silty clay to clay | 0.0 | 1.00 | 5 | 1,500 | 1,219 | 1,500 | 2.96 | N/A | N/A | 0.971 | N/A | 0.311 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 13.50 | 11.10 | 0.26 | 2.34 | clayey silt to silty clay | -1.0 | 1.00 | 6 | 1,620 | 1,277 | 1,595 | 2.80 | N/A | N/A | 0.969 | N/A | 0.320 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 14.50 | 12.32 | 0.29 | 2.37 | clayey silt to silty clay | -2.0 | 1.00 | 6 | 1,740 | 1,334 | 1,653 | 2.77 | N/A | N/A | 0.966 | N/A | 0.328 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 15.50 | 10.13 | 0.19 | 1.89 | clayey silt to silty clay | -3.0 | 1.00 | 5 | 1,860 | 1,392 | 1,710 | 2.81 | N/A | N/A | 0.964 | N/A | 0.335 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 16.50 | 9.13 | 0.15 | 1.59 | clayey silt to silty clay | -4.0 | 1.00 | 5 | 1,980 | 1,450 | 1,768 | 2.82 | N/A | N/A | 0.962 | N/A | 0.341 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 17.50 | 13.40 | 0.26 | 1.93 | clayey silt to silty clay | -5.0 | 1.00 | 7 | 2,100 | 1,507 | 1,825 | 2.73 | N/A | N/A | 0.959 | N/A | 0.347 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.97 |
| 18.50 | 16.75 | 0.21 | 1.25 | sandy silt to clayey silt | -6.0 | 1.00 | 7 | 2,220 | 1,565 | 1,883 | 2.55 | 3.04 | 61.23 | 0.957 | 1.000 | 0.353 | 0.101 | 0.369 | YES | 2.8 | 9.7 | 296 | 13.3 | N/A | 2.087 | 0.25 | 0.72 |
| 19.50 | 12.20 | 0.31 | 2.51 | clayey silt to silty clay | -7.0 | 1.00 | 6 | 2,340 | 1,622 | 1,941 | 2.85 | N/A | N/A | 0.955 | N/A | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.72 |
| 20.50 | 12.97 | 0.41 | 3.15 | silty clay to clay | -8.0 | 1.00 | 9 | 2,460 | 1,680 | 1,998 | 2.90 | N/A | N/A | 0.952 | N/A | 0.363 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.72 |
| 21.50 | 14.03 | 0.52 | 3.70 | silty clay to clay | -9.0 | 1.00 | 9 | 2,580 | 1,738 | 2,056 | 2.92 | N/A | N/A | 0.950 | N/A | 0.367 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.72 |
| 22.50 | 25.75 | 0.63 | 2.43 | sandy silt to clayey silt | -10.0 | 1.00 | 10 | 2,700 | 1,795 | 2,113 | 2.60 | 3.32 | 92.67 | 0.948 | 1.000 | 0.371 | 0.154 | 0.534 | YES | 2.8 | 12.8 | 496 | 17.0 | N/A | 1.684 | 0.20 | 0.52 |
| 23.50 | 28.73 | 0.96 | 3.35 | clayey silt to silty clay | -11.0 | 1.00 | 14 | 2,820 | 1,853 | 2,171 | 2.66 | N/A | N/A | 0.945 | N/A | 0.374 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 24.50 | 21.55 | 0.75 | 3.45 | clayey silt to silty clay | -12.0 | 1.00 | 11 | 2,940 | 1,910 | 2,229 | 2.78 | N/A | N/A | 0.943 | N/A | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 25.50 | 19.35 | 0.50 | 2.57 | clayey silt to silty clay | -13.0 | 1.00 | 10 | 3,060 | 1,968 | 2,286 | 2.74 | N/A | N/A | 0.941 | N/A | 0.380 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 26.50 | 36.03 | 0.88 | 2.42 | sandy silt to clayey silt | -14.0 | 1.00 | 14 | 3,180 | 2,026 | 2,344 | 2.51 | 2.83 | 101.38 | 0.938 | 0.997 | 0.383 | 0.177 | 0.591 | YES | 2.8 | 16.1 | 785 | 21.0 | N/A | 1.330 | 0.16 | 0.36 |
| 27.50 | 56.90 | 0.52 | 0.92 | sand to silty sand | -15.0 | 1.00 | 14 | 3,300 | 2,083 | 2,401 | 2.10 | 1.45 | 80.92 | 0.936 | 0.989 | 0.385 | 0.129 | 0.426 | YES | 1.3 | 14.3 | 619 | 16.1 | N/A | 1.791 | 0.21 | 0.15 |
| 28.50 | 123.22 | 0.93 | 0.75 | sand | -16.0 | 1.00 | 25 | 3,420 | 2,141 | 2,459 | 1.78 | 1.09 | 129.90 | 0.934 | 0.976 | 0.388 | 0.284 | 0.918 | YES | 0.0 | 22.2 | 1,200 | 22.2 | N/A | 1.227 | 0.15 | 0.00 |
| 29.50 | 476.62 | 2.55 | 0.53 | gravelly sand to sand | -17.0 | 1.00 | 79 | 3,540 | 2,198 | 2,517 | 1.25 | 1.00 | 454.60 | 0.931 | 0.963 | 0.390 | N/A | N/A | NO | N/A | N/A | N/A | 70.8 | N/A | 0.000 | 0.00 | 0.00 |
| 30.50 | 544.30 | 2.40 | 0.44 | gravelly sand to sand | -18.0 | 1.00 | 91 | 3,660 | 2,256 | 2,574 | 1.15 | 1.00 | 512.49 | 0.926 | 0.953 | 0.390 | N/A | N/A | NO | N/A | N/A | N/A | 80.0 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | 495.04 | 2.44 | 0.49 | gravelly sand to sand | -19.0 | 1.00 | 83 | 3,780 | 2,314 | 2,632 | 1.22 | 1.00 | 460.27 | 0.918 | 0.943 | 0.390 | N/A | N/A | NO | N/A | N/A | N/A | 71.9 | N/A | 0.000 | 0.00 | 0.00 |
| 32.50 | 342.78 | 1.00 | 0.29 | gravelly sand to sand | -20.0 | 1.00 | 57 | 3,900 | 2,371 | 2,689 | 1.19 | 1.00 | 314.81 | 0.909 | 0.934 | 0.389 | N/A | N/A | NO | N/A | N/A | N/A | 49.3 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | 422.53 | 1.97 | 0.47 | gravelly sand to sand | -21.0 | 1.00 | 70 | 4,020 | 2,429 | 2,747 | 1.26 | 1.00 | 383.42 | 0.901 | 0.925 | 0.388 | N/A | N/A | NO | N/A | N/A | N/A | 60.1 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | 342.05 | 2.11 | 0.62 | gravelly sand to sand | -22.0 | 1.00 | 57 | 4,140 | 2,486 | 2,805 | 1.41 | 1.00 | 306.77 | 0.893 | 0.917 | 0.387 | N/A | N/A | NO | N/A | N/A | N/A | 48.1 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 366.27 | 1.41 | 0.39 | gravelly sand to sand | -23.0 | 1.00 | 61 | 4,260 | 2,544 | 2,862 | 1.25 | 1.00 | 324.75 | 0.885 | 0.908 | 0.385 | N/A | N/A | NO | N/A | N/A | N/A | 51.0 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 596.02 | 3.61 | 0.61 | gravelly sand to sand | -24.0 | 1.00 | 99 | 4,380 | 2,602 | 2,920 | 1.25 | 1.00 | 522.58 | 0.877 | 0.900 | 0.384 | N/A | N/A | NO | N/A | N/A | N/A | 82.2 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 694.00 | 5.20 | 0.75 | gravelly sand to sand | -25.0 | 1.00 | 116 | 4,500 | 2,659 | 2,977 | 1.30 | 1.00 | 601.86 | 0.869 | 0.892 | 0.382 | N/A | N/A | NO | N/A | N/A | N/A | 94.8 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 588.15 | 3.87 | 0.66 | gravelly sand to sand | -26.0 | 1.00 | 98 | 4,620 | 2,717 | 3,035 | 1.29 | 1.00 | 504.63 | 0.861 | 0.885 | 0.381 | N/A | N/A | NO | N/A | N/A | N/A | 79.6 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 422.48 | 1.41 | 0.33 | gravelly sand to sand | -27.0 | 1.00 | 70 | 4,740 | 2,774 | 3,093 | 1.18 | 1.00 | 358.71 | 0.852 | 0.877 | 0.379 | N/A | N/A | NO | N/A | N/A | N/A | 56.6 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 384.95 | 1.29 | 0.34 | gravelly sand to sand | -28.0 | 1.00 | 64 | 4,860 | 2,832 | 3,150 | 1.22 | 1.00 | 323.50 | 0.844 | 0.870 | 0.377 | N/A | N/A | NO | N/A | N/A | N/A | 51.1 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 349.96 | 2.54 | 0.72 | gravelly sand to sand | -29.0 | 1.00 | 58 | 4,980 | 2,890 | 3,208 | 1.48 | 1.00 | 291.15 | 0.836 | 0.863 | 0.375 | N/A | N/A | NO | N/A | N/A | N/A | 46.1 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 389.30 | 2.01 | 0.52 | gravelly sand to sand | -30.0 | 1.00 | 65 | 5,100 | 2,947 | 3,265 | 1.34 | 1.00 | 320.70 | 0.828 | 0.856 | 0.373 | N/A | N/A | NO | N/A | N/A | N/A | 50.8 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 451.33 | 2.39 | 0.53 | gravelly sand to sand | -31.0 | 1.00 | 75 | 5,220 | 3,005 | 3,323 | 1.31 | 1.00 | 368.22 | 0.820 | 0.850 | 0.370 | N/A | N/A | NO | N/A | N/A | N/A | 58.4 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 435.12 | 1.87 | 0.43 | gravelly sand to sand | -32.0 | 1.00 | 73 | 5,340 | 3,062 | 3,381 | 1.26 | 1.00 | 351.64 | 0.812 | 0.843 | 0.368 | N/A | N/A | NO | N/A | N/A | N/A | 55.8 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 425.65 | 2.37 | 0.56 | gravelly sand to sand | -33.0 | 1.00 | 71 | 5,460 | 3,120 | 3,438 | 1.35 | 1.00 | 340.80 | 0.804 | 0.837 | 0.366 | N/A | N/A | NO | N/A | N/A | N/A | 54.1 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 375.28 | 2.80 | 0.75 | gravelly sand to sand | -34.0 | 1.00 | 63 | 5,580 | 3,178 | 3,496 | 1.48 | 1.00 | 297.73 | 0.795 | 0.831 | 0.363 | N/A | N/A | NO | N/A | N/A | N/A | 47.3 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 421.02 | 2.83 | 0.67 | gravelly sand to sand | -35.0 | 1.00 | 70 | 5,700 | 3,235 | 3,553 | 1.42 | 1.00 | 331.03 | 0.787 | 0.825 | 0.361 | N/A | N/A | NO | N/A | N/A | N/A | 52.6 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 408.48 | 2.95 | 0.72 | gravelly sand to sand | -36.0 | 1.00 | 68 | 5,820 | 3,293 | 3,611 | 1.45 | 1.00 | 318.35 | 0.779 | 0.819 | 0.358 | N/A | N/A | NO | N/A | N/A | N/A | 50.7 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 445.62 | 2.75 | 0.62 | gravelly sand to sand | -37.0 | 1.00 | 74 | 5,940 | 3,350 | 3,669 | 1.38 | 1.00 | 344.30 | 0.771 | 0.814 | 0.355 | N/A | N/A | NO | N/A | N/A | N/A | 54.8 | N/A | 0.000 | 0.00 | 0.00 |
| 50.50 | 328.55 | 2.39 | 0.73 | gravelly sand to sand | -38.0 | 1.00 | 55 | 6,060 | 3,408 | 3,726 | 1.52 | 1.00 | 251.69 | 0.763 | 0.808 | 0.353 | N/A | N/A | NO | N/A | N/A | N/A | 40.1 | N/A | 0.000 | 0.00 | 0.00 |
| 51.50 | 363.18 | 2.54 | 0.70 | gravelly sand to sand | -39.0 | 1.00 | 61 | 6,180 | 3,466 | 3,784 | 1.48 | 1.00 | 275.90 | 0.755 | 0.803 | 0.350 | N/A | N/A | NO | N/A | N/A | N/A | 44.0 | N/A | 0.000 | 0.00 | 0.00 |
| 52.50 | 422.44 | 3.30 | 0.78 | gravelly sand to sand | -40.0 | 1.00 | 70 | 6,300 | 3,523 | 3,841 | 1.48 | 1.00 | 318.29 | 0.747 | 0.797 | 0.347 | N/A | N/A | NO | N/A | N/A | N/A | 50.8 | N/A | 0.000 | 0.00 | 0.00 |
| 53.50 | 399.95 | 3.49 | 0.87 | sand | -41.0 | 1.00 | 80 | 6,420 | 3,581 | 3,899 | 1.53 | 1.00 | 298.91 | 0.739 | 0.792 | 0.344 | N/A | N/A | NO | N/A | N/A | N/A | 57.3 | N/A | 0.000 | 0.00 | 0.00 |
| 54.50 | 365.12 | 4.03 | 1.10 | sand | -42.0 | 1.00 | 73 | 6,540 | 3,638 | 3,957 | 1.64 | 1.00 | 270.70 | 0.730 | 0.787 | 0.341 | N/A | N/A | NO | N/A | N/A | N/A | 51.9 | N/A | 0.000 | 0.00 | 0.00 |
| 55.50 | 387.10 | 3.94 | 1.02 | sand | -43.0 | 1.00 | 77 | 6,660 | 3,696 | 4,014 | 1.60 | 1.00 | 284.76 | 0.722 | 0.782 | 0.338 | N/A | N/A | NO | N/A | N/A | N/A | 54.6 | N/A | 0.000 | 0.00 | 0.00 |
| 56.50 | 506.82 | 3.42 | 0.67 | gravelly sand to sand | -44.0 | 1.00 | 84 | 6,780 | 3,754 | 4,072 | 1.39 | 1.00 | 369.95 | 0.714 | 0.777 | 0.335 | N/A | N/A | NO | N/A | N/A | N/A | 59.2 | N/A | 0.000 | 0.00 | 0.00 |
| 57.50 | 557.47 | 3.38 | 0.61 | gravelly sand to sand | -45.0 | 1.00 | 93 | 6,900 | 3,811 | 4,129 | 1.33 | 1.00 | 403.84 | 0.706 | 0.773 | 0.332 | N/A | N/A | NO | N/A | N/A | N/A | 64.7 | N/A | 0.000 | 0.00 | 0.00 |
| 58.50 | 456.07 | 4.26 | 0.93 | sand | -46.0 | 1.00 | 91 | 7,020 | 3,869 | 4,187 | 1.53 | 1.00 | 327.91 | 0.698 | 0.768 | 0.329 | N/A | N/A | NO | N/A | N/A | N/A | 63.0 | N/A | 0.000 | 0.00 | 0.00 |
| 59.50 | 383.92 | 4.97 | 1.29 | sand | -47.0 | 1.00 | 77 | 7,140 | 3,926 | 4,245 | 1.69 | 1.03 | 282.23 | 0.690 | 0.764 | 0.326 | N/A | N/A | NO | N/A | N/A | N/A | 52.7 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 296 |
| avg= | 679 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-14 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 10.00 ft |
| GWT Elev. During Test | 2.50 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.40 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 7.50 ft below ground surface

GWT Depth For Design, Zwd = 5.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 5.00 feet

Earthquake-Induced Settlements:

- Liquefaction-Induced Settlement = 0.62 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.00 inches <--- Dry or Unsaturated Sands

Total: 0.62 inches

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 11.37 | 0.30 | 2.63 | silty clay to clay |
| 6.50 | 9.67 | 0.50 | 5.09 | clay |
| 7.50 | 8.23 | 0.37 | 4.43 | clay |
| 8.50 | 7.20 | 0.15 | 2.11 | silty clay to clay |
| 9.50 | 9.10 | 0.17 | 1.90 | clayey silt to silty clay |
| 10.50 | 10.73 | 0.20 | 1.83 | clayey silt to silty clay |
| 11.50 | 20.52 | 0.38 | 1.85 | sandy silt to clayey silt |
| 12.50 | 46.23 | 0.29 | 0.63 | sand to silty sand |
| 13.50 | 42.83 | 0.41 | 0.96 | silty sand to sandy silt |
| 14.50 | 13.08 | 0.31 | 2.36 | clayey silt to silty clay |
| 15.50 | 13.07 | 0.27 | 2.04 | clayey silt to silty clay |
| 16.50 | 13.17 | 0.28 | 2.13 | clayey silt to silty clay |
| 17.50 | 15.63 | 0.26 | 1.65 | sandy silt to clayey silt |
| 18.50 | 11.22 | 0.40 | 3.51 | silty clay to clay |
| 19.50 | 13.82 | 0.45 | 3.22 | silty clay to clay |
| 20.50 | 22.64 | 0.76 | 3.34 | clayey silt to silty clay |
| 21.50 | 19.33 | 0.65 | 3.36 | clayey silt to silty clay |
| 22.50 | 19.52 | 0.54 | 2.76 | clayey silt to silty clay |
| 23.50 | 71.13 | 1.06 | 1.48 | silty sand to sandy silt |
| 24.50 | 284.05 | 3.98 | 1.40 | sand |
| 25.50 | 221.17 | 1.61 | 0.73 | sand |
| 26.50 | 347.78 | 1.46 | 0.42 | gravelly sand to sand |
| 27.50 | 372.13 | 1.32 | 0.35 | gravelly sand to sand |
| 28.50 | 553.42 | 1.46 | 0.26 | gravelly sand to sand |
| | | | | #N/A |
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| SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 4.0 | 1.00 | 8 | 660 | 629 | 660 | 2.62 | N/A | N/A | 0.987 | N/A | 0.269 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 3.0 | 1.00 | 10 | 780 | 686 | 780 | 2.89 | N/A | N/A | 0.985 | N/A | 0.291 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 2.0 | 1.00 | 8 | 900 | 744 | 900 | 2.93 | N/A | N/A | 0.983 | N/A | 0.309 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 1.0 | 1.00 | 5 | 1,020 | 802 | 958 | 2.80 | N/A | N/A | 0.980 | N/A | 0.324 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 0.0 | 1.00 | 5 | 1,140 | 859 | 1,015 | 2.71 | N/A | N/A | 0.978 | N/A | 0.337 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| -1.0 | 1.00 | 5 | 1,260 | 917 | 1,073 | 2.66 | N/A | N/A | 0.976 | N/A | 0.349 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| -2.0 | 1.00 | 8 | 1,380 | 974 | 1,130 | 2.50 | 2.78 | 81.81 | 0.973 | 1.000 | 0.358 | 0.131 | 0.469 | YES | 2.8 | 13.7 | 568 | 18.1 | N/A | 1.551 | 0.19 | 0.44 |
| -3.0 | 1.00 | 12 | 1,500 | 1,032 | 1,188 | 1.95 | 1.24 | 79.93 | 0.971 | 1.000 | 0.367 | 0.127 | 0.446 | YES | 1.3 | 16.3 | 806 | 18.2 | N/A | 1.558 | 0.19 | 0.25 |
| -4.0 | 1.66 | 24 | 1,620 | 1,090 | 1,246 | 1.79 | 1.10 | 105.42 | 0.969 | 1.000 | 0.374 | 0.189 | 0.648 | YES | 2.8 | 32.8 | 1,200 | 40.9 | N/A | 0.000 | 0.00 | 0.25 |
| -5.0 | 1.00 | 7 | 1,740 | 1,147 | 1,303 | 2.71 | N/A | N/A | 0.966 | N/A | 0.381 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| -6.0 | 1.00 | 7 | 1,860 | 1,205 | 1,361 | 2.69 | N/A | N/A | 0.964 | N/A | 0.387 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| -7.0 | 1.00 | 7 | 1,980 | 1,262 | 1,418 | 2.71 | N/A | N/A | 0.962 | N/A | 0.392 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| -8.0 | 1.00 | 6 | 2,100 | 1,320 | 1,476 | 2.60 | 3.31 | 70.68 | 0.959 | 1.000 | 0.397 | 0.113 | 0.365 | YES | 2.8 | 10.1 | 316 | 13.7 | N/A | 2.018 | 0.24 | 0.01 |
| -9.0 | 1.00 | 7 | 2,220 | 1,378 | 1,534 | 2.93 | N/A | N/A | 0.957 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| -10.0 | 1.00 | 9 | 2,340 | 1,435 | 1,591 | 2.84 | N/A | N/A | 0.955 | N/A | 0.405 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| -11.0 | 1.00 | 11 | 2,460 | 1,493 | 1,649 | 2.69 | N/A | N/A | 0.952 | N/A | 0.408 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| -12.0 | 1.00 | 10 | 2,580 | 1,550 | 1,706 | 2.75 | N/A | N/A | 0.950 | N/A | 0.411 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| -13.0 | 1.00 | 10 | 2,700 | 1,608 | 1,764 | 2.71 | N/A | N/A | 0.948 | N/A | 0.414 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| -14.0 | 1.00 | 24 | 2,820 | 1,666 | 1,822 | 2.11 | 1.47 | 114.77 | 0.945 | 1.000 | 0.416 | 0.221 | 0.681 | YES | 2.8 | 27.6 | 1,200 | 34.8 | N/A | 0.052 | 0.01 | 0.00 |
| -15.0 | 1.00 | 57 | 2,940 | 1,723 | 1,879 | 1.69 | 1.03 | 314.73 | 0.943 | 1.000 | 0.418 | N/A | N/A | NO | N/A | N/A | N/A | 58.6 | N/A | 0.000 | 0.00 | 0.00 |
| -16.0 | 1.00 | 44 | 3,060 | 1,781 | 1,937 | 1.54 | 1.00 | 234.38 | 0.941 | 1.000 | 0.420 | N/A | N/A | NO | N/A | N/A | N/A | 44.9 | N/A | 0.000 | 0.00 | 0.00 |
| -17.0 | 1.00 | 58 | 3,180 | 1,838 | 1,994 | 1.24 | 1.00 | 362.75 | 0.938 | 1.000 | 0.422 | N/A | N/A | NO | N/A | N/A | N/A | 58.0 | N/A | 0.000 | 0.00 | 0.00 |
| -18.0 | 1.00 | 62 | 3,300 | 1,896 | 2,052 | 1.18 | 1.00 | 382.20 | 0.936 | 1.000 | 0.424 | N/A | N/A | NO | N/A | N/A | N/A | 61.2 | N/A | 0.000 | 0.00 | 0.00 |
| -19.0 | 1.00 | 92 | 3,420 | 1,954 | 2,110 | 0.97 | 1.00 | 559.95 | 0.934 | 1.000 | 0.425 | N/A | N/A | NO | N/A | N/A | N/A | 89.8 | N/A | 0.000 | 0.00 | 0.00 |

max= 1,200
min= 316
avg= 818

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED GROUND SETTLEMENTS USING SPT DATA

<<------------------------------ GENERAL INPUT DATA ---------------------------------------->

| | |
|---|---|
| **Project Name** | Marina Del Rey - Parcel 44 |
| **Location** | Marina Del Rey |
| **GDC Project Number** | LA-1049 |
| **Exploration No.** | R-12-15 |
| **Ground Surf. Elevation** | 10.00 ft |
| **GWT Depth During Testing, $Z_w$** | 13.00 ft |
| **GWT Depth for Design, $Z_{wd}$** | 5.00 ft |
| **Soil Unit Weight, $\gamma_t$** | 120.00 pcf |
| **Earthquake Magnitude, $M_{eq}$** | 6.80 |
| **Peak Ground Acceelration, $A_{max}$** | 0.40 g |
| **Required FS** | 1.30 |

<< ------------------------------------------------------------------------------------------------------------- REFERENCES --------------------------------------------------------------------------------------------------->

**+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)**

**++ Combination of corrrection factors for hammer energy ratio ($C_E$), borehole diameter ($C_B$), rod length ($C_R$), and sampling method ($C_S$). Correction Factor = $C_E C_B C_R C_S$**

**+++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$**

*** FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_\alpha$ where $K_\alpha$ =1.0 and MSF = 1.28**

**** $S_r$ value based on extrapolated median curve and limited to a maximum value of 1,200 psf (Seed & Harder, 1990)**

***** Based on Tokimatsu and Seed (1987) and Pradel (1998).**

**Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.**

**<<----------------------- SUMMARY OF RESULTS -------------------------->>**

**Total Thickness of Liquefiable Soils = 5.00 feet**

**Earthquake-Induced Settlements:**

| | | | |
|---|---|---|---|
| **- Liquefaction-Induced Settlement =** | **0.21** | **inches** | **<--- Saturated Sands** |
| **- Seismic Compaction Settlement =** | **0.00** | **inches** | **<--- Dry or Unsaturated Sands** |
| **Total:** | **0.21** | **inches** | |

| INPUT SOIL PROFILE | | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | RESIDUAL STRENGTH ** | | | GROUND SETTLEMENT *** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth $Z$ (ft) | Layer Thickness $H$ (ft) | USCS Soil Type | Equivalent SPT Blow Count $N$ (blows/ft) | Fines Content $FC$ (%) | Combined SPT Correction Factor ++ $C$ | Bottom of Layer Elevation (ft) | Total Vert. Stress (Design) $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Testing) $\sigma_{v'}$ (psf) | SPT Stress Correction Factor+ $C_N$ | Stress Corrected SPT Blow Count $(N_1)_{60}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Shear Stress Reduction Coeff.+ $r_d$ | Correction for High Overburden Stress+ $K_\sigma$ | Cyclic Stress Ratio++ $CSR$ | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction * $FS$ | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Cyclic Shear Strain ** $\gamma_c$ (%) | Vol. Strain ** $\varepsilon_v$ (%) | Layer Settlement ** $S_i$ (in.) |
| 10.00 | 5 | SM/ML | 14.7 | 15 | 1.09 | -2.5 | 1200 | 888 | 1200 | 1.291 | 20.7 | 24.2 | 0.977 | 1.000 | 0.343 | 0.277 | 1.035 | YES | 1.3 | 22.0 | 1,200 | N/A | 0.357 | 0.214 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED GROUND SETTLEMENTS USING SPT DATA

**<<------------------------------- GENERAL INPUT DATA ----------------------------------------->**

| | |
|---|---|
| **Project Name** | Marina Del Rey - Parcel 44 |
| **Location** | Marina Del Rey |
| **GDC Project Number** | LA-1049 |
| **Exploration No.** | R-12-16 |
| **Ground Surf. Elevation** | 16.00 ft |
| **GWT Depth During Testing, $Z_w$** | 14.00 ft |
| **GWT Depth for Design, $Z_{wd}$** | 11.00 ft |
| **Soil Unit Weight, $\gamma_t$** | 120.00 pcf |
| **Earthquake Magnitude, $M_{eq}$** | 6.80 |
| **Peak Ground Acceelration, $A_{max}$** | 0.40 g |
| **Required FS** | 1.30 |

**<< ---------------------------------------------------------------------------------------------------------- REFERENCES ----------------------------------------------------------------------------------------------->**

**+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)**

**++ Combination of corrrection factors for hammer energy ratio ($C_E$), borehole diameter ($C_B$), rod length ($C_R$), and sampling method ($C_S$). Correction Factor = $C_E\, C_B\, C_R\, C_S$**

**+++ CSR = $0.65\, A_{max}\, (\sigma_v/\sigma_v')\, r_d$**

*** FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_\alpha$ where $K_\alpha$ =1.0 and MSF = 1.28**

**** $S_r$ value based on extrapolated median curve and limited to a maximum value of 1,200 psf (Seed & Harder, 1990)**

***** Based on Tokimatsu and Seed (1987) and Pradel (1998).**

**Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.**

**<<----------------------- SUMMARY OF RESULTS -------------------------->>**

**Total Thickness of Liquefiable Soils = 10.00 feet**

**Earthquake-Induced Settlements:**

| | | | |
|---|---|---|---|
| **- Liquefaction-Induced Settlement =** | **0.16** | **inches** | **<--- Saturated Sands** |
| **- Seismic Compaction Settlement =** | **0.00** | **inches** | **<--- Dry or Unsaturated Sands** |
| **Total:** | **0.16** | **inches** | |

| INPUT SOIL PROFILE | | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | RESIDUAL STRENGTH ** | | | GROUND SETTLEMENT *** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth $Z$ (ft) | Layer Thickness $H$ (ft) | USCS Soil Type | Equivalent SPT Blow Count $N$ (blows/ft) | Fines Content $FC$ (%) | Combined SPT Correction Factor ++ $C$ | Bottom of Layer Elevation (ft) | Total Vert. Stress (Design) $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Testing) $\sigma_{v'}$ (psf) | SPT Stress Correction Factor+ $C_N$ | Stress Corrected SPT Blow Count $(N_1)_{60}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Shear Stress Reduction Coeff.+ $r_d$ | Correction for High Overburden Stress+ $K_\sigma$ | Cyclic Stress Ratio++ $CSR$ | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction * $FS$ | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Cyclic Shear Strain ** $\gamma_c$ (%) | Vol. Strain ** $\varepsilon_v$ (%) | Layer Settlement ** $S_i$ (in.) |
| 12.75 | 3.5 | SP/SC | 19.4 | 16 | 1.09 | 1.5 | 1530 | 1421 | 1530 | 1.143 | 24.2 | 28.2 | 0.970 | 1.000 | 0.272 | 0.379 | 1.790 | NO | N/A | N/A | N/A | N/A | 0.068 | 0.028 |
| 20.00 | 5 | SC | 14.1 | 36 | 1.22 | -6.5 | 2400 | 1838 | 2026 | 0.994 | 17.1 | 25.5 | 0.953 | 1.000 | 0.324 | 0.302 | 1.200 | YES | 2.9 | 20.0 | 1,183 | N/A | 0.121 | 0.073 |
| 30.00 | 5 | SP-SM | 25.0 | 5 | 1.29 | -16.5 | 3600 | 2414 | 2602 | 0.877 | 28.3 | 28.3 | 0.930 | 0.928 | 0.361 | 0.380 | 1.255 | YES | 0.5 | 28.8 | 1,200 | N/A | 0.096 | 0.057 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED GROUND SETTLEMENTS USING SPT DATA

<<------------------------------- GENERAL INPUT DATA ---------------------------------------->

| | |
|---|---|
| **Project Name** | Marina Del Rey - Parcel 44 |
| **Location** | Marina Del Rey |
| **GDC Project Number** | LA-1049 |
| **Exploration No.** | R-12-17 |
| **Ground Surf. Elevation** | 18.00 ft |
| **GWT Depth During Testing, $Z_w$** | 16.00 ft |
| **GWT Depth for Design, $Z_{wd}$** | 13.00 ft |
| **Soil Unit Weight, $\gamma_t$** | 120.00 pcf |
| **Earthquake Magnitude, $M_{eq}$** | 6.80 |
| **Peak Ground Acceelration, $A_{max}$** | 0.40 g |
| **Required FS** | 1.30 |

<< ------------------------------------------------------------------------------------------------------------- REFERENCES ----------------------------------------------------------------------------------------------->

**+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)**

**++ Combination of corrrection factors for hammer energy ratio ($C_E$), borehole diameter ($C_B$), rod length ($C_R$), and sampling method ($C_S$). Correction Factor = $C_E C_B C_R C_S$**

**+++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$**

*** FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_\alpha$ where $K_\alpha$ =1.0 and MSF = 1.28**

**** $S_r$ value based on extrapolated median curve and limited to a maximum value of 1,200 psf (Seed & Harder, 1990)**

***** Based on Tokimatsu and Seed (1987) and Pradel (1998).**

**Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.**

**<<----------------------- SUMMARY OF RESULTS -------------------------->>**

**Total Thickness of Liquefiable Soils = 4.50 feet**

**Earthquake-Induced Settlements:**

| | | | |
|---|---|---|---|
| **- Liquefaction-Induced Settlement =** | **0.19** | **inches** | **<--- Saturated Sands** |
| **- Seismic Compaction Settlement =** | **0.00** | **inches** | **<--- Dry or Unsaturated Sands** |
| **Total:** | **0.19** | **inches** | |

| INPUT SOIL PROFILE | | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | RESIDUAL STRENGTH ** | | | GROUND SETTLEMENT *** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth $Z$ (ft) | Layer Thickness $H$ (ft) | USCS Soil Type | Equivalent SPT Blow Count $N$ (blows/ft) | Fines Content $FC$ (%) | Combined SPT Correction Factor ++ $C$ | Bottom of Layer Elevation (ft) | Total Vert. Stress (Design) $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Testing) $\sigma_{v'}$ (psf) | SPT Stress Correction Factor+ $C_N$ | Stress Corrected SPT Blow Count $(N_1)_{60}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Shear Stress Reduction Coeff.+ $r_d$ | Correction for High Overburden Stress+ $K_\sigma$ | Cyclic Stress Ratio++ $CSR$ | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction * $FS$ | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Cyclic Shear Strain ** $\gamma_c$ (%) | Vol. Strain ** $\varepsilon_v$ (%) | Layer Settlement ** $S_i$ (in.) |
| 15.25 | 4.5 | SC | 12.7 | 16 | 1.22 | 0.5 | 1830 | 1690 | 1830 | 1.045 | 16.2 | 19.8 | 0.964 | 1.000 | 0.272 | 0.213 | 1.009 | YES | 1.4 | 17.6 | -758 | N/A | 0.344 | 0.186 |

# APPENDIX D
# LATERAL SPREADING SCREENING ANALYSIS

GROUP DELTA CONSULTANTS

### 3.5.1 9 *Chemical Test Results*

Chemical tests results (sulfate, chloride, resistivity, pH) for the onsite soils must address the presence of chemicals deleterious to concrete and ferrous materials. The tests must be in accordance with California Test Methods, Department of Transportation, or equivalent (aqueous solution tests, such as EPA Tests or similar methods are not acceptable for determination of resistivity) Resistivity tests must be performed on soils samples in a saturated condition.

## 3.5.2 Engineering Analysis and Standards

### 3.5.2.1 *Slope Stability Analysis*

Slope stability analysis, including establishing design criteria and performing calculations, will generally be required for all cut, fill, and natural slopes when the slope gradient is steeper that 2:1 (H:V). Slope stability analysis may be required for slopes at 2:1 gradient or flatter if there is evidence that the slope may not meet County minimum standards.

The data to be utilized in the slope stability analysis shall be based on detailed site plans, geologic/geotechnical cross section, detailed field descriptions, onsite exploration data, and laboratory test data. It is the responsibility of the soils engineer to determine the weakest potential failure surface based on the above factors. In performing any analysis, the worst possible conditions must be utilized.

### 3.5.2.2 *Static and Seismic Slope Stability (Global)*

- All slope stability analyses submitted for review may be checked by various methods including Modified Bishop, Janbu, Spencer, etc., to verify compliance with the minimum acceptable safety factor The following shall be considered when preparing stability analyses:

- Separate calculations shall be performed for static and seismic conditions.

- The minimum acceptable factor of safety for shear strength is 1.50 for static loads and 1 10 for pseudostatic loads. The factor of safety for strength is defined as the ratio of the shearing resistance force to the actual driving force acting along the potential failure surface.

- The pseudostatic slope stability analyses shall be the minimum seismic analysis accepted for design.

- Conventional static methods of slope stability analysis based upon principles of mechanics may be used to analyze the stability of slopes under both static and pseudostatic conditions.

- The analyses shall include the effect of expected maximum moisture conditions, soil weight, and seepage or pore pressure where applicable. Saturated conditions shall be utilized unless it can be shown that other moisture contents will represent the worst possible conditions for the project.

- Pseudostatic analysis shall include the effect of static loads combined with a horizontal inertial force acting out of the slope and through the center of gravity of the potential sliding mass.

- A minimum pseudostatic horizontal inertial force equal to 0.15 times the total weight of the potential sliding mass shall be used. This minimum lateral design value should be increased where, in the opinion of the private consultant(s), subsurface conditions or the proximity of active faults warrant the use of higher values.

- Potential failure modes must be based upon the stratigraphy and structure of the slope analyzed and input from the consulting engineering geologist.

- The cross section determined to be the critical section shall be used in the stability analyses of the slope or for the buttress design. The use of a weighted average for the Factor of Safety using multiple cross sections of the slope is not acceptable.

- The critical potential failure surface used in the analysis may be composed of circles, planes, or other shapes considered to yield the minimum factor of safety against sliding and most appropriate to the soil and geologic site conditions. In cohesive soils, a vertical tension crack extending down from the top of the slope to the potential failure surface may be used to limit the lateral extent of the potential sliding mass.

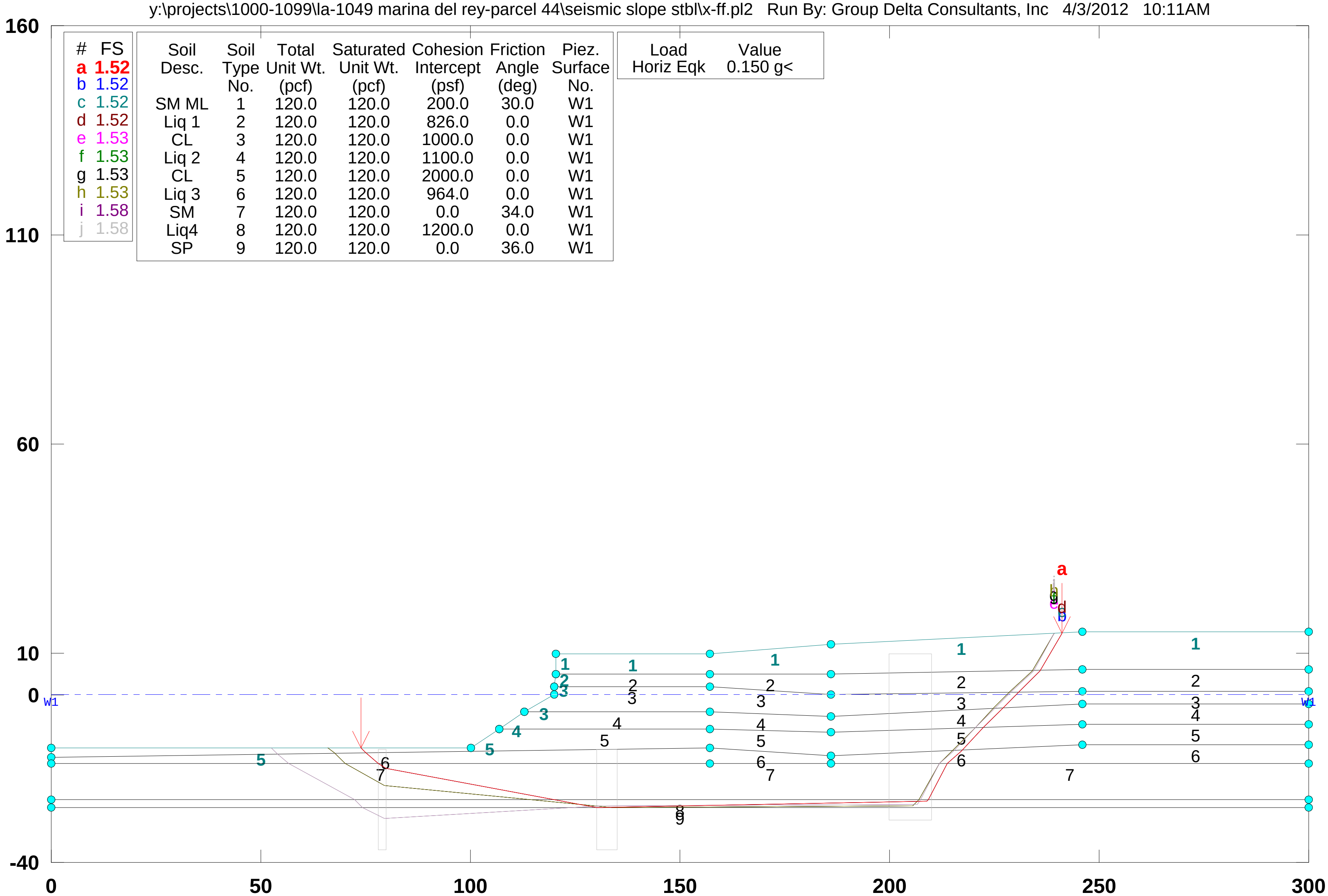
# LA-1049 Marina Del Rey

y:\projects\1000-1099\la-1049 marina del rey-parcel 44\seismic slope stbl\x-ff.pl2   Run By: Group Delta Consultants, Inc   4/3/2012   10:11AM

| # | FS |
|---|---|
| a | 1.52 |
| b | 1.52 |
| c | 1.52 |
| d | 1.52 |
| e | 1.53 |
| f | 1.53 |
| g | 1.53 |
| h | 1.53 |
| i | 1.58 |
| j | 1.58 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| SM ML | 1 | 120.0 | 120.0 | 200.0 | 30.0 | W1 |
| Liq 1 | 2 | 120.0 | 120.0 | 826.0 | 0.0 | W1 |
| CL | 3 | 120.0 | 120.0 | 1000.0 | 0.0 | W1 |
| Liq 2 | 4 | 120.0 | 120.0 | 1100.0 | 0.0 | W1 |
| CL | 5 | 120.0 | 120.0 | 2000.0 | 0.0 | W1 |
| Liq 3 | 6 | 120.0 | 120.0 | 964.0 | 0.0 | W1 |
| SM | 7 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |
| Liq4 | 8 | 120.0 | 120.0 | 1200.0 | 0.0 | W1 |
| SP | 9 | 120.0 | 120.0 | 0.0 | 36.0 | W1 |

| Load | Value |
|---|---|
| Horiz Eqk | 0.150 g< |




**PCSTABL5M/si FSmin=1.52**

**Safety Factors Are Calculated By The Modified Janbu Method**

STED

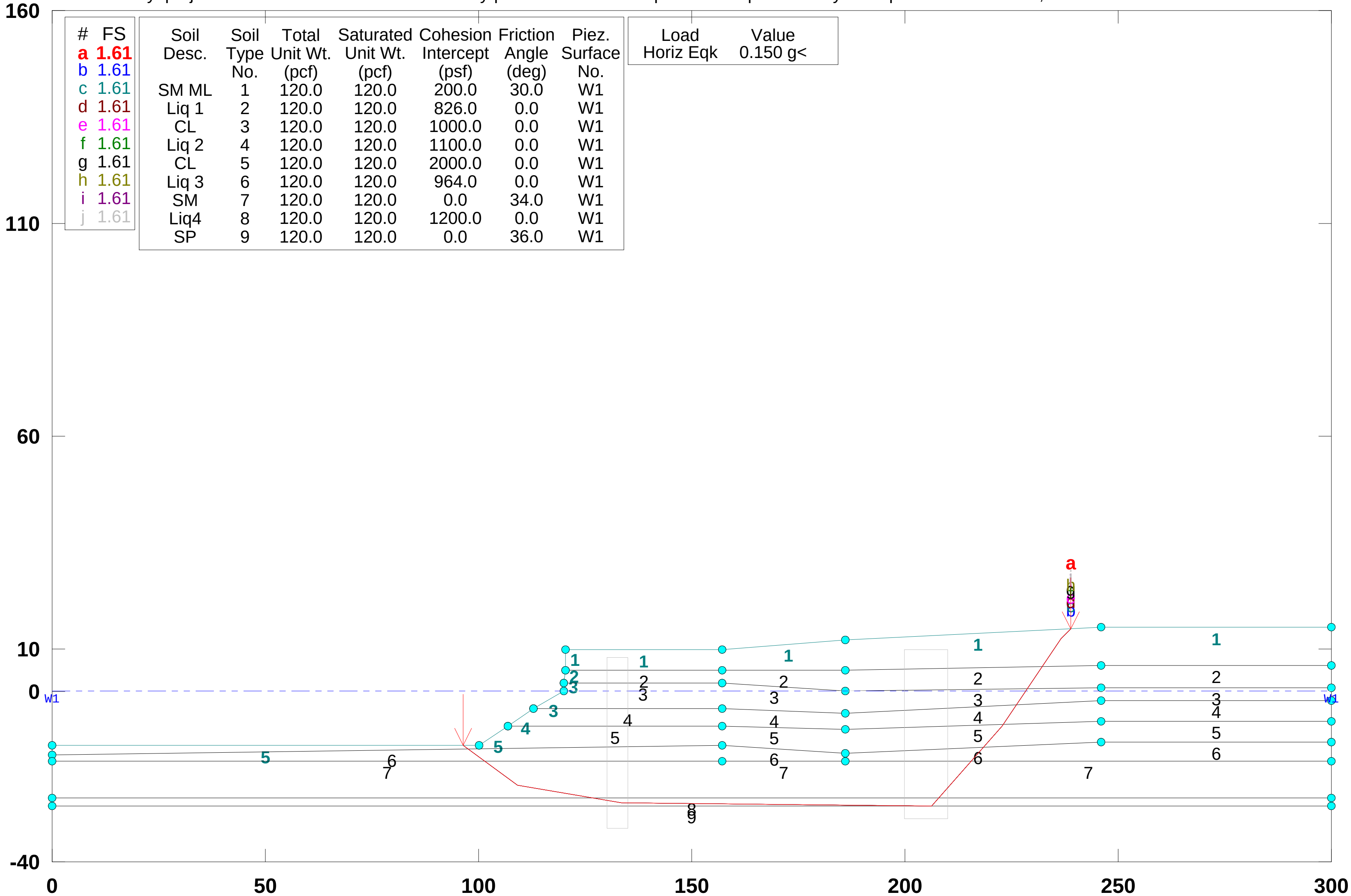
# LA-1049 Marina Del Rey

y:\projects\1000-1099\la-1049 marina del rey-parcel 44\seismic slope stbl\x-ff1.pl2   Run By: Group Delta Consultants, Inc   4/3/2012   10:04AM

| # | FS |
|---|---|
| a | 1.61 |
| b | 1.61 |
| c | 1.61 |
| d | 1.61 |
| e | 1.61 |
| f | 1.61 |
| g | 1.61 |
| h | 1.61 |
| i | 1.61 |
| j | 1.61 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| SM ML | 1 | 120.0 | 120.0 | 200.0 | 30.0 | W1 |
| Liq 1 | 2 | 120.0 | 120.0 | 826.0 | 0.0 | W1 |
| CL | 3 | 120.0 | 120.0 | 1000.0 | 0.0 | W1 |
| Liq 2 | 4 | 120.0 | 120.0 | 1100.0 | 0.0 | W1 |
| CL | 5 | 120.0 | 120.0 | 2000.0 | 0.0 | W1 |
| Liq 3 | 6 | 120.0 | 120.0 | 964.0 | 0.0 | W1 |
| SM | 7 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |
| Liq4 | 8 | 120.0 | 120.0 | 1200.0 | 0.0 | W1 |
| SP | 9 | 120.0 | 120.0 | 0.0 | 36.0 | W1 |

| Load | Value |
|---|---|
| Horiz Eqk | 0.150 g< |

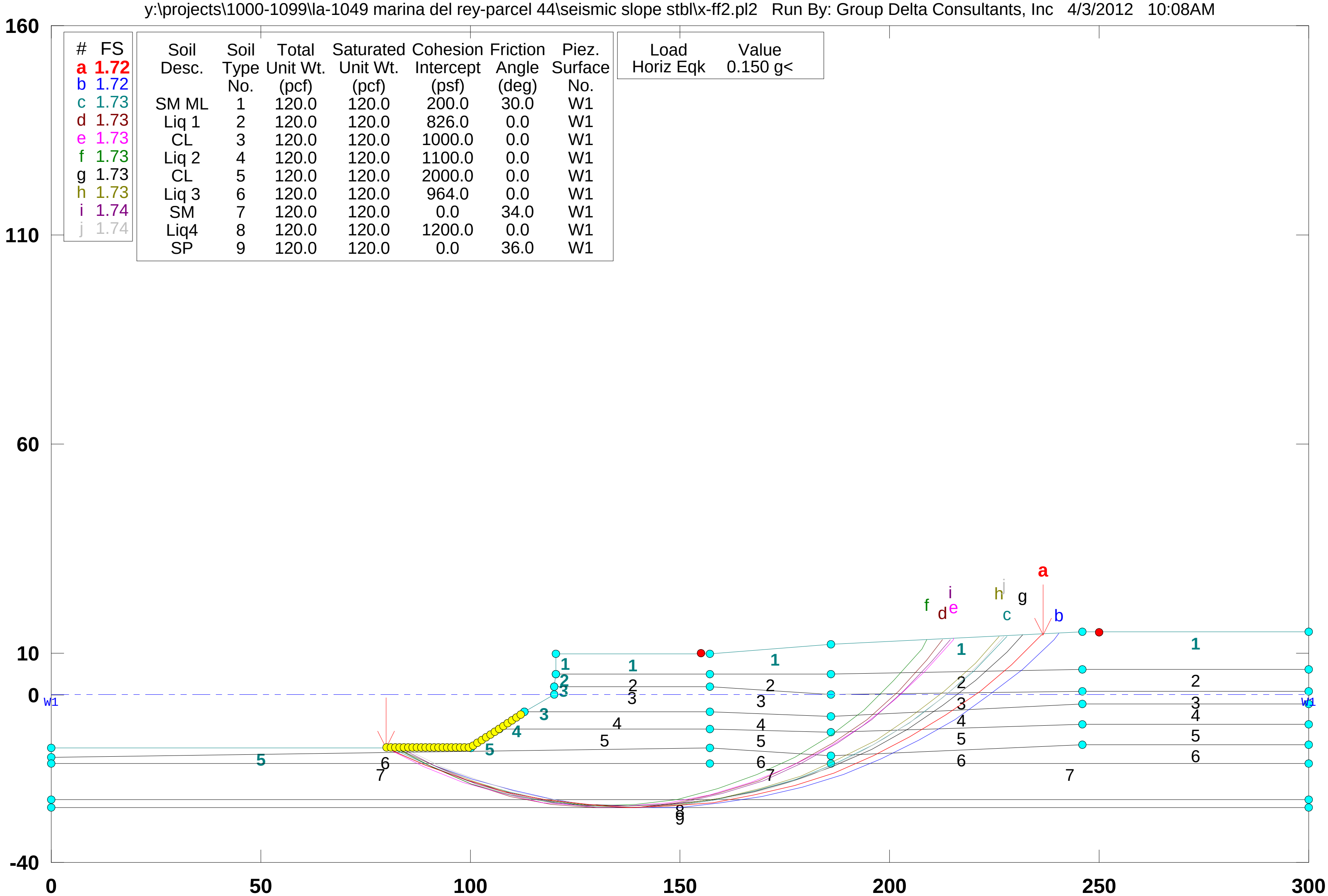



**PCSTABL5M/si FSmin=1.61**
**Safety Factors Are Calculated By The Modified Janbu Method**

STED

# LA-1049 Marina Del Rey

y:\projects\1000-1099\la-1049 marina del rey-parcel 44\seismic slope stbl\x-ff2.pl2   Run By: Group Delta Consultants, Inc   4/3/2012   10:08AM




| # | FS |
|---|---|
| a | 1.72 |
| b | 1.72 |
| c | 1.73 |
| d | 1.73 |
| e | 1.73 |
| f | 1.73 |
| g | 1.73 |
| h | 1.73 |
| i | 1.74 |
| j | 1.74 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| SM ML | 1 | 120.0 | 120.0 | 200.0 | 30.0 | W1 |
| Liq 1 | 2 | 120.0 | 120.0 | 826.0 | 0.0 | W1 |
| CL | 3 | 120.0 | 120.0 | 1000.0 | 0.0 | W1 |
| Liq 2 | 4 | 120.0 | 120.0 | 1100.0 | 0.0 | W1 |
| CL | 5 | 120.0 | 120.0 | 2000.0 | 0.0 | W1 |
| Liq 3 | 6 | 120.0 | 120.0 | 964.0 | 0.0 | W1 |
| SM | 7 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |
| Liq4 | 8 | 120.0 | 120.0 | 1200.0 | 0.0 | W1 |
| SP | 9 | 120.0 | 120.0 | 0.0 | 36.0 | W1 |

| Load | Value |
|---|---|
| Horiz Eqk | 0.150 g< |

**PCSTABL5M/si  FSmin=1.72**

**Safety Factors Are Calculated By The Modified Bishop Method**

**STED**

# LA-1049 Marina Del Rey

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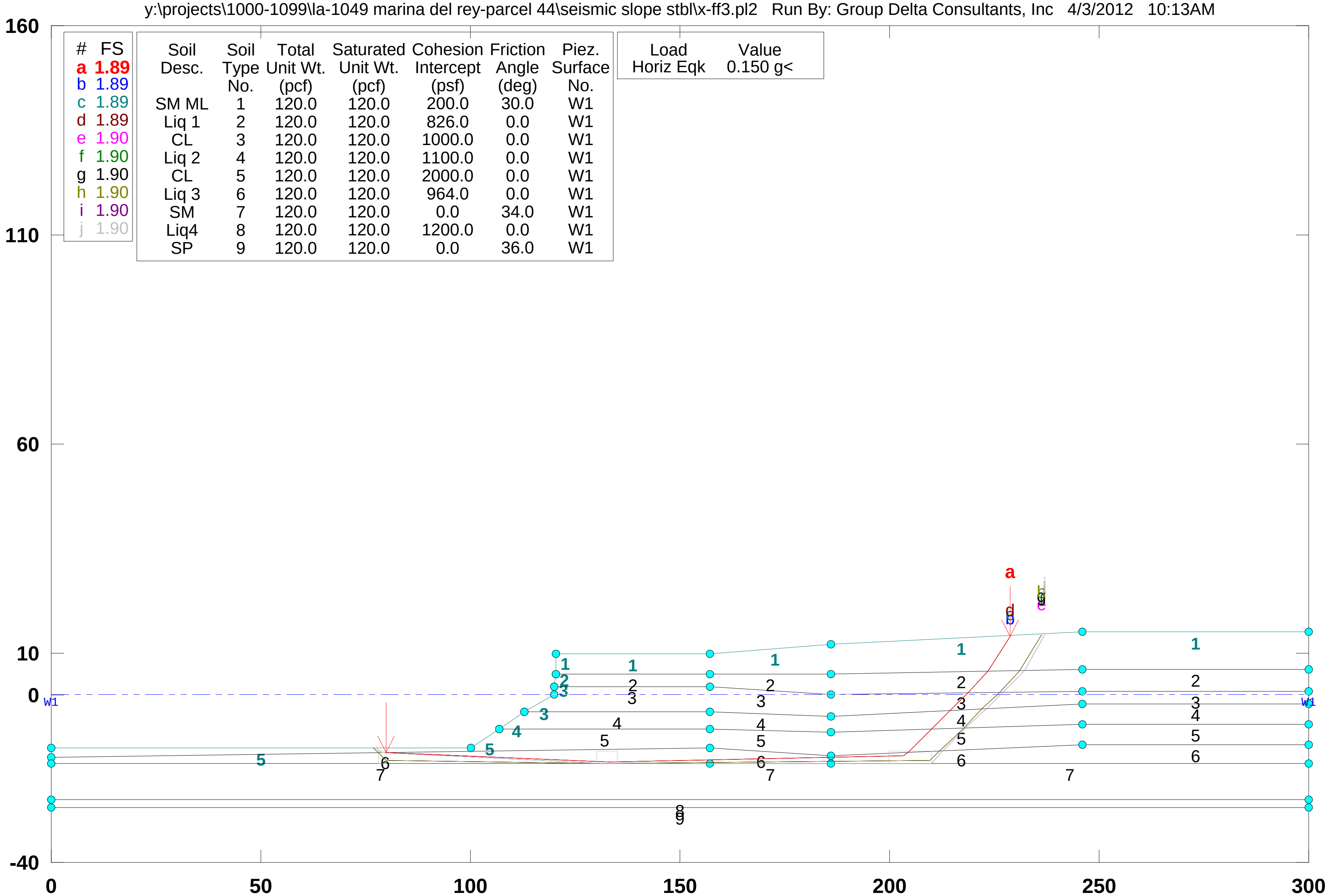


| # | FS |
|---|---|
| a | 1.89 |
| b | 1.89 |
| c | 1.89 |
| d | 1.89 |
| e | 1.90 |
| f | 1.90 |
| g | 1.90 |
| h | 1.90 |
| i | 1.90 |
| j | 1.90 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| SM ML | 1 | 120.0 | 120.0 | 200.0 | 30.0 | W1 |
| Liq 1 | 2 | 120.0 | 120.0 | 826.0 | 0.0 | W1 |
| CL | 3 | 120.0 | 120.0 | 1000.0 | 0.0 | W1 |
| Liq 2 | 4 | 120.0 | 120.0 | 1100.0 | 0.0 | W1 |
| CL | 5 | 120.0 | 120.0 | 2000.0 | 0.0 | W1 |
| Liq 3 | 6 | 120.0 | 120.0 | 964.0 | 0.0 | W1 |
| SM | 7 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |
| Liq4 | 8 | 120.0 | 120.0 | 1200.0 | 0.0 | W1 |
| SP | 9 | 120.0 | 120.0 | 0.0 | 36.0 | W1 |

| Load | Value |
|---|---|
| Horiz Eqk | 0.150 g< |

**PCSTABL5M/si FSmin=1.89**

**Safety Factors Are Calculated By The Modified Janbu Method**

**STED**

# LA-1049 Marina Del Rey

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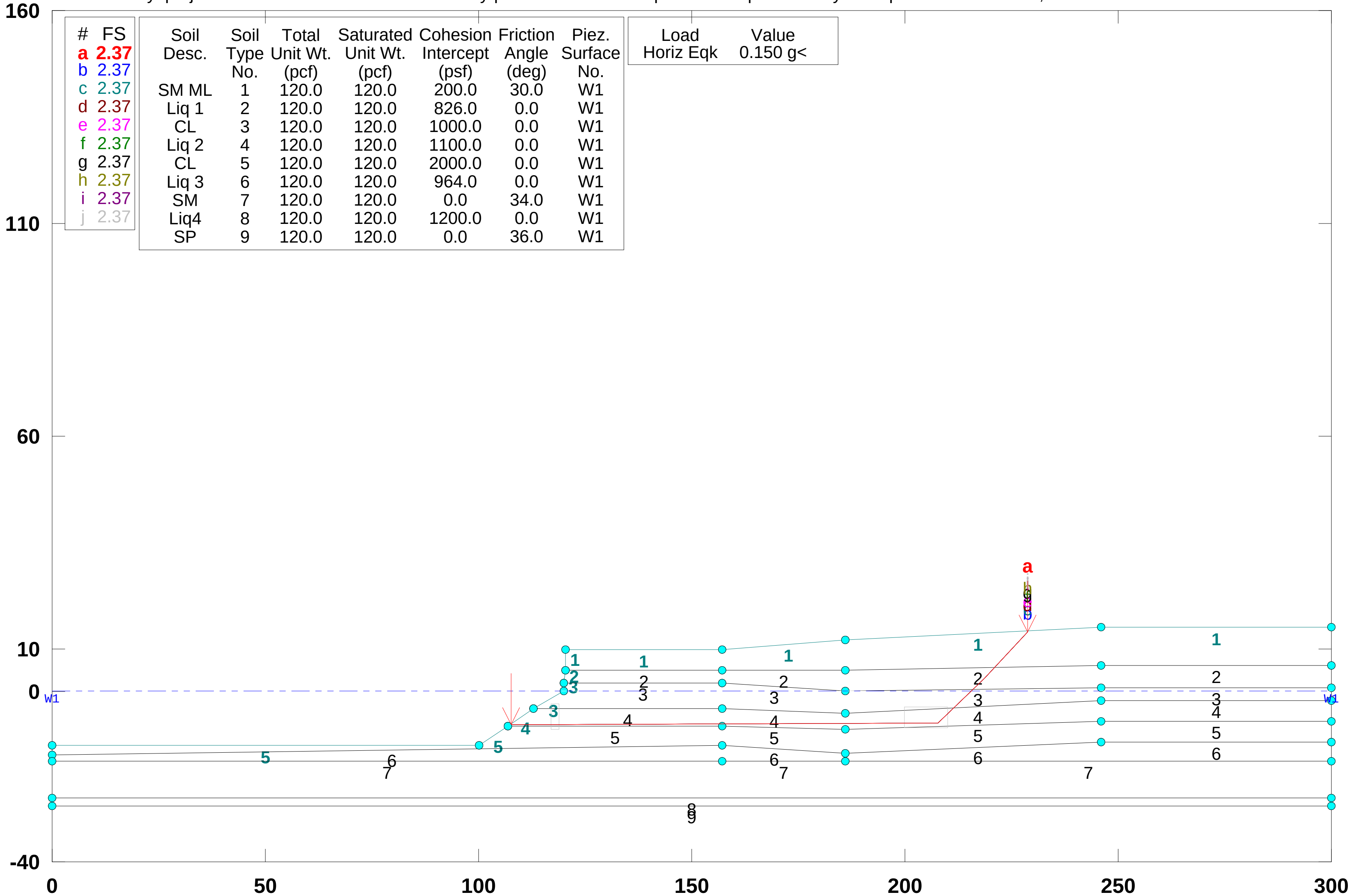


| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| SM ML | 1 | 120.0 | 120.0 | 200.0 | 30.0 | W1 |
| Liq 1 | 2 | 120.0 | 120.0 | 826.0 | 0.0 | W1 |
| CL | 3 | 120.0 | 120.0 | 1000.0 | 0.0 | W1 |
| Liq 2 | 4 | 120.0 | 120.0 | 1100.0 | 0.0 | W1 |
| CL | 5 | 120.0 | 120.0 | 2000.0 | 0.0 | W1 |
| Liq 3 | 6 | 120.0 | 120.0 | 964.0 | 0.0 | W1 |
| SM | 7 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |
| Liq4 | 8 | 120.0 | 120.0 | 1200.0 | 0.0 | W1 |
| SP | 9 | 120.0 | 120.0 | 0.0 | 36.0 | W1 |

**PCSTABL5M/si FSmin=2.37**

**Safety Factors Are Calculated By The Modified Janbu Method**

STED

# LA-1049 Marina Del Rey

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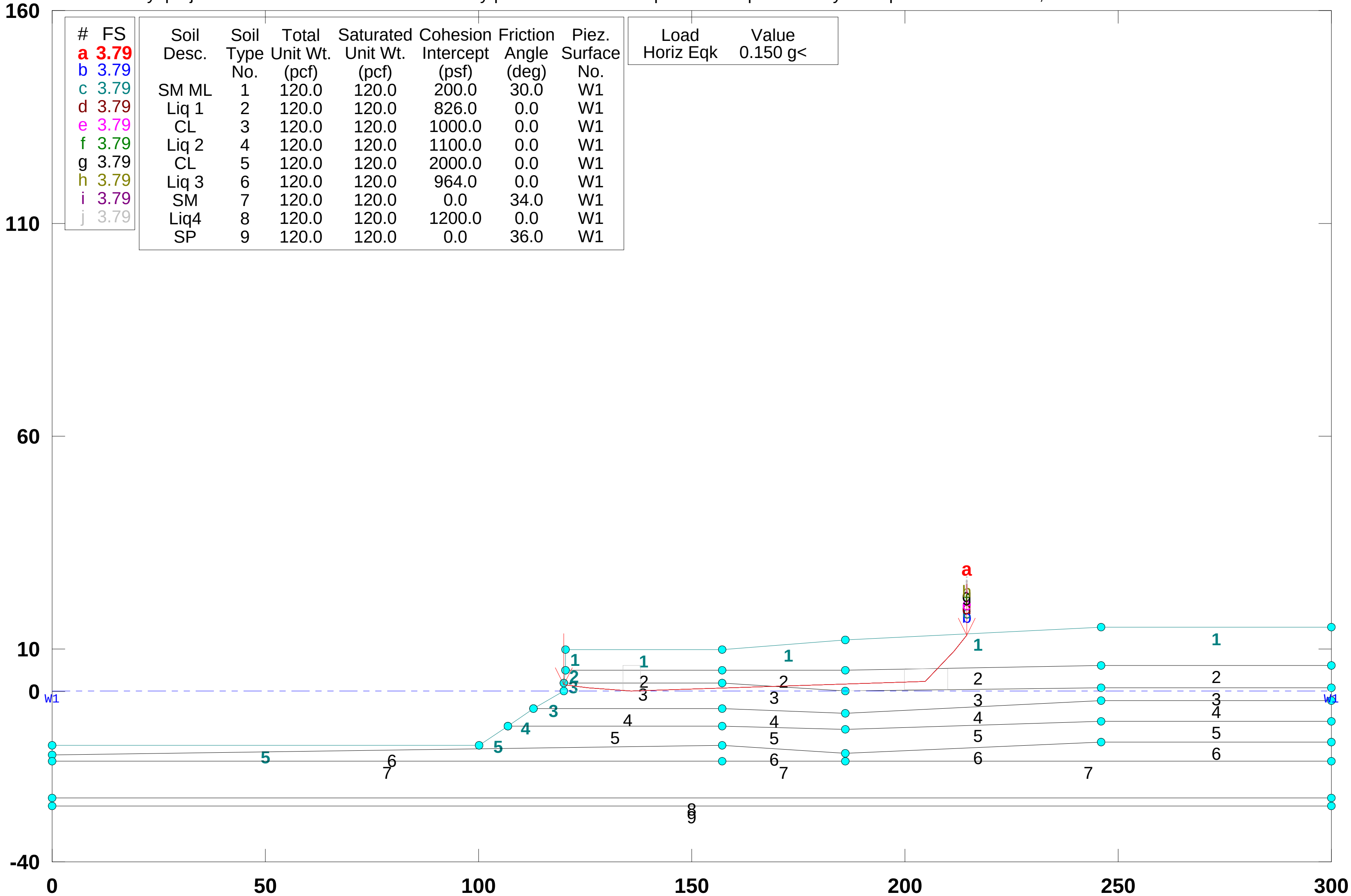



**PCSTABL5M/si FSmin=3.79**

**Safety Factors Are Calculated By The Modified Janbu Method**

STED

**Addendum 1 to the Geotechnical Engineering Report**

GROUP DELTA CONSULTANTS

Geotechnical Engineering

Geology

Hydro Geology

Earthquake Engineering

Materials Testing & Inspection

Forensic Services

March 11, 2014 LA-1049A

Pacific Marina Venture, LLC
c/o Pacific Ocean Management
13737 Fiji Way C-10
Marina Del Rey, CA 90292

Attention: Ms. Marsha Santry

Subject: Addendum 1 - Geotechnical Engineering Report
Update to Seismic Design Parameters
Proposed Commercial and Retail Development
Marina Del Rey - Parcel 44
Northwest Corner of Mindanao Way and Admiralty Way
Marina Del Rey, California

Reference: Group Delta Consultants, Inc.,"Geotechnical Engineering Report, Proposed Commercial and Retail Development, Marina Del Rey – Parcel 44, Northwest Corner of Mindanao Way and Admiralty Way, Marina Del Rey Area of Los Angeles, California", June 1, 2012.

Dear Ms. Santry:

Group Delta Consultants (GDC) is pleased to submit this addendum to our above referenced geotechnical report, dated June 1, 2012. On January 1, 2014, the new version of the Los Angeles County Building Code was adopted, and is based on the requirements and provisions of the California Building Code (CBC) 2013, and ASCE 7-10. The new code includes changes to the seismic design parameters, including the peak ground acceleration adjusted for site class, and its effects of liquefaction and lateral spreading. This addendum addresses these changes in the code.

There have been no significant changes in the project descriptions and no changes in the site conditions from those documented in our 2012 original report. Therefore, all other conclusions and recommendations provided our reference report remain applicable, without change.

## 1.0 UPDATED SEISMIC GROUND MOTION PARAMETERS

Updated design ground motion parameters were developed in accordance with CBC 2013 for the proposed new buildings. The site coordinates used in our seismic hazard analysis are: -118.4413 (Longitude) and 33.9806 (Latitude).

The subsurface soil profile at the site consists of 25 to 30 feet of stiff clay underlain by dense sands. Based on the shear wave velocity, $V_S$, measurements performed in

CPT-12-07, the site has a $V_{S(30)}$ of 976 fps, and is classified as Site Class D, corresponding to a "Stiff Soil" profile.

The seismic design parameters were calculated using the USGS Ground Motion Parameter Calculator (Version 5.1.0), are summarized in Table 1. The calculations of the seismic parameters are provided in Appendix A.

| **Table 1: Seismic Ground Motion Values** | |
|---|---|
| Latitude: 33.9806 Longitude: -118.4413 | |
| Site Class | D |
| Seismic Design Category | D |
| Mapped MCE Spectral Response Acceleration at Short Period ($S_S$) | 1.611g |
| Mapped MCE Spectral Response Acceleration at Period of 1 Second ($S_1$) | 0.635g |
| Site Coefficient, $F_a$ | 1.0 |
| Site Coefficient, $F_v$ | 1.5 |
| Adjusted MCE Spectral Response Acceleration at Short Period ($S_{MS}$) | 1.611g |
| Adjusted MCE Spectral Response Acceleration at Period of 1 Second ($S_{M1}$) | 0.953g |
| Design Earthquake Spectral Response Acceleration at Short Period ($S_{DS}$) | 1.074g |
| Design Earthquake Spectral Response Acceleration at Period of 1 Second ($S_{D1}$) | 0.635g |
| Peak Ground Acceleration Adjusted for Site Class ($PGA_M$) | 0.617g |

The peak ground acceleration adjusted for site class is 0.617g.

## 2.0 LIQUEFACTION POTENTIAL:

In our original geotechnical engineering report, the potential for liquefaction of soils underlying the site was evaluated using the simplified liquefaction analysis procedure recommended by NCEER (Youd and Idriss, 1997, 2001) for both SPT and CPT data, and based on a design groundwater level of El. +5 feet, the predominant moment magnitude, $M_W$, of 6.8, and a PGA of 0.40g in accordance of ASCE 7-05.

In accordance with ASCE 7-10, the updated PGA adjusted for site class is 0.617g. This PGA is significantly higher than calculated under the previous code, and impacts the liquefaction potential and seismic settlement at the site. The total dynamic settlement was evaluated using the updated PGA (0.617g) and both our SPT and CPT data. For comparison, a summary of the total dynamic settlement estimated under each proposed building for both the old and new PGA is provided in Table 2.

**Table 2: Summary of Dynamic Settlement under Each Proposed Building**

| Proposed Structure | Description | Exploration | Total Dynamic Settlement (in) Based on PGA=0.4g | Total Dynamic Settlement (in) Based on PGA=0.62g |
|---|---|---|---|---|
| BLDG. 1 | New Restroom - Single Story | CPT-12-14 | 0.62 | **0.66** |
| BLDG. II | New Grocery Store - Single Story | CPT-12-11 | 0.15 | **0.17** |
| | | CPT12-12 | 0.15 | **0.39** |
| | | CPT-12-13 | 0.98 | **1.05** |
| | | R-12-20 | 0 | **0** |
| BLDG. III | New Restroom - Single Story | CPT-12-10 | 0.14 | **0.32** |
| BLDG. IV | Retail Boat Supply Story - 2 story | CPT-12-7 | 0.23 | **0.67** |
| | | CPT-12-8 | 0.22 | **0.47** |
| | | CPT-12-9 | 0.02 | **0.12** |
| | | CPT-12-10 | 0.14 | **0.32** |
| | | R-12-18 | 0 | **0** |
| | | R-12-19 | 0 | **0** |
| BLDG. V | Boat Broker Office - Single Story | CPT-12-4 | 0.38 | **0.77** |
| | | CPT-12-5 | 0.69 | **1.41** |
| | | CPT-12-6 | 0.36 | **0.53** |
| | | R-12-17 | 0.19 | **0.81** |
| BLDG. VI | Boaters Lounge - Single Story | CPT-12-03 | 0.31 | **0.76** |
| | | R-12-16 | 0.16 | **0.34** |
| BLDG VII | Storage Rack for Boats - 4 story | CPT-12-1 | 0.38 | **0.53** |
| | | CPT-12-2 | 1.23 | **2.03** |
| | | R-12-15 | 0.21 | **0.74** |

As noted in the Table 1, the total dynamic settlement based on the updated PGA on average varies from about 0.5 to 0.75 inches, with maximums in the range of 1 to 2 inches. The differential seismic settlements will be likely less than 1 inch over a horizontal distance of 30 feet.

## 3.0 LATERAL SPREADING:

Under cyclic loading, lateral spreading can occur on gently sloping ground or on virtually flat ground adjacent to bodies of water. The subject site is underlain by approximately 25 to 30 feet of firm to stiff clays interbedded with thin layers of silty sands, underlain by very dense sand, some of which are susceptible to liquefaction. However, these interbedded thin sandy layers appear to be localized and do not form a continuous liquefiable layer.

As discussed in our original report, using a conservative approach, the potential for lateral spreading at the site was conservatively evaluated following the screening analysis outlined in SP 117A – Guidelines for Evaluating and Mitigating Seismic Hazards in California (2008). Liquefiable layers were conservatively modeled as continuous clay with undrained shear strength equivalent to post liquefaction residual shear strength. Based on our evaluation, the post liquefaction residual shear strength of the liquefied silty sands are generally greater than 1.0 ksf.

Computer program PCSTBL 5 was used in our analysis. Based on the Manual for Preparation of Geotechnical Reports prepared by County of Los Angeles Department of Public Works (dated July 2010), for screening analysis, a horizontal seismic coefficient of 0.15 was use. The analyses indicated that the factor of safety under seismic event is greater than 1.5, which is much higher than the 1.1 factor of safety required for seismic condition.

Comparing the liquefaction potential results for both the old and the new PGA, there is essentially no change in the locations and extent of continuous layers that may liquefy as a result of an increase in the PGA. As a result, the conservative lateral spreading screening analysis performed in our original geotechnical engineering report remains valid, and is still conservative. Therefore, liquefaction induced lateral spreading and seismic slope stability is not an issue at this site.

Should you have any questions regarding this addendum, please feel free to call us at (310) 320-5100.

The following items are attached:

APPENDIX A: Seismic Design Parameters Based On CBC2013/ASCE 7-10
APPENDIX B: Updated Liquefaction Analyses

Sincerely,
**GROUP DELTA CONSULTANTS, INC.**

REGISTERED PROFESSIONAL ENGINEER THOMAS D. SWANTKO No. 813 Exp. 12/31/13 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER PIROOZ KASHIGHANDI C 80178 CIVIL STATE OF CALIFORNIA

Thomas D. Swantko, G.E. #813
Principal Geotechnical Engineer

Pirooz Kashighandi, Ph.D., P.E.
Senior Engineer

Distribution: Addressee (1)

N:\Projects\1000-1099\LA-1049 Marina Del Rey-Parcel 44\Report\Addendum\LA-1049a Addendum 1.doc

# APPENDIX A

SEISMIC DESIGN PARAMETERS BASED ON CBC2013/ASCE 7-10

GROUP DELTA CONSULTANTS

# USGS Design Maps Summary Report

## User–Specified Input

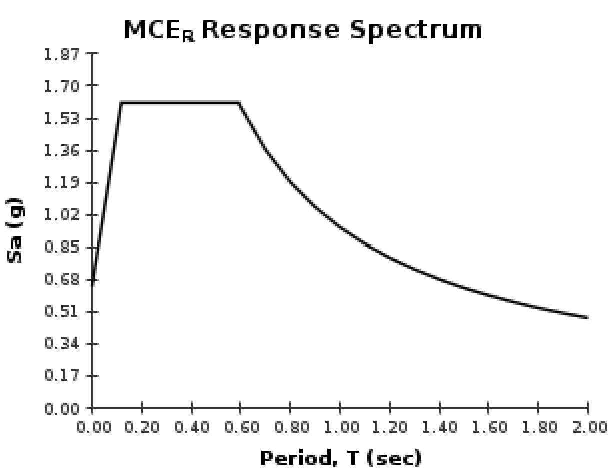
| | |
|---|---|
| **Report Title** | Parcel 44 - Marina Del Rey<br>Thu March 6, 2014 22:19:07 UTC |
| **Building Code Reference Document** | ASCE 7-10 Standard<br>(which utilizes USGS hazard data available in 2008) |
| **Site Coordinates** | 33.9806°N, 118.4413°W |
| **Site Soil Classification** | Site Class D – "Stiff Soil" |
| **Risk Category** | I/II/III |

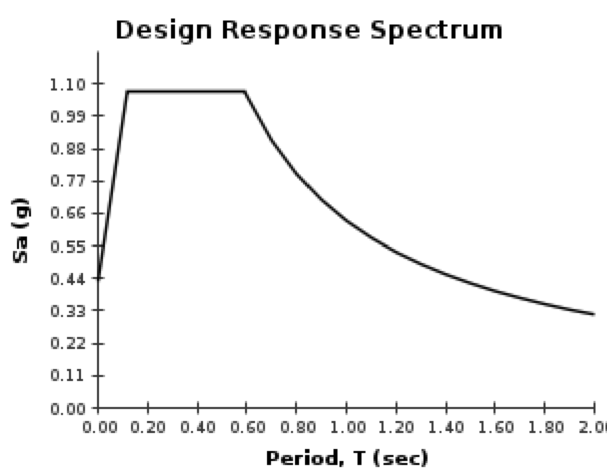

## USGS–Provided Output

$S_S =$ 1.611 g  $S_{MS} =$ 1.611 g  $S_{DS} =$ 1.074 g

$S_1 =$ 0.635 g  $S_{M1} =$ 0.953 g  $S_{D1} =$ 0.635 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.




For $PGA_M$, $T_L$, $C_{RS}$, and $C_{R1}$ values, please view the detailed report.

# USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.9806°N, 118.4413°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

## Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain $S_S$) and 1.3 (to obtain $S_1$). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

| | |
|---|---|
| **From Figure 22-1** [1] | $S_S$ = 1.611 g |
| **From Figure 22-2** [2] | $S_1$ = 0.635 g |

## Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

| **Site Class** | $\bar{v}_s$ | $\bar{N}$ or $\bar{N}_{ch}$ | $\bar{s}_u$ |
|---|---|---|---|
| A. Hard Rock | >5,000 ft/s | N/A | N/A |
| B. Rock | 2,500 to 5,000 ft/s | N/A | N/A |
| C. Very dense soil and soft rock | 1,200 to 2,500 ft/s | >50 | >2,000 psf |
| D. Stiff Soil | 600 to 1,200 ft/s | 15 to 50 | 1,000 to 2,000 psf |
| E. Soft clay soil | <600 ft/s | <15 | <1,000 psf |
| | Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI$ > 20, • Moisture content $w$ ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf | | |
| F. Soils requiring site response analysis in accordance with Section 21.1 | See Section 20.3.1 | | |

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

## Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake ($MCE_R$) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient $F_a$

| Site Class | Mapped $MCE_R$ Spectral Response Acceleration Parameter at Short Period | | | | |
|---|---|---|---|---|---|
| | $S_S \le 0.25$ | $S_S = 0.50$ | $S_S = 0.75$ | $S_S = 1.00$ | $S_S \ge 1.25$ |
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| C | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 |
| D | 1.6 | 1.4 | 1.2 | 1.1 | 1.0 |
| E | 2.5 | 1.7 | 1.2 | 0.9 | 0.9 |
| F | See Section 11.4.7 of ASCE 7 | | | | |

Note: Use straight–line interpolation for intermediate values of $S_S$

**For Site Class = D and $S_S$ = 1.611 g, $F_a$ = 1.000**

Table 11.4–2: Site Coefficient $F_v$

| Site Class | Mapped $MCE_R$ Spectral Response Acceleration Parameter at 1–s Period | | | | |
|---|---|---|---|---|---|
| | $S_1 \le 0.10$ | $S_1 = 0.20$ | $S_1 = 0.30$ | $S_1 = 0.40$ | $S_1 \ge 0.50$ |
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| C | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 |
| D | 2.4 | 2.0 | 1.8 | 1.6 | 1.5 |
| E | 3.5 | 3.2 | 2.8 | 2.4 | 2.4 |
| F | See Section 11.4.7 of ASCE 7 | | | | |

Note: Use straight–line interpolation for intermediate values of $S_1$

**For Site Class = D and $S_1$ = 0.635 g, $F_v$ = 1.500**

| | |
|---|---|
| **Equation (11.4–1):** | $S_{MS} = F_a S_S = 1.000 \times 1.611 = 1.611$ g |
| **Equation (11.4–2):** | $S_{M1} = F_v S_1 = 1.500 \times 0.635 = 0.953$ g |

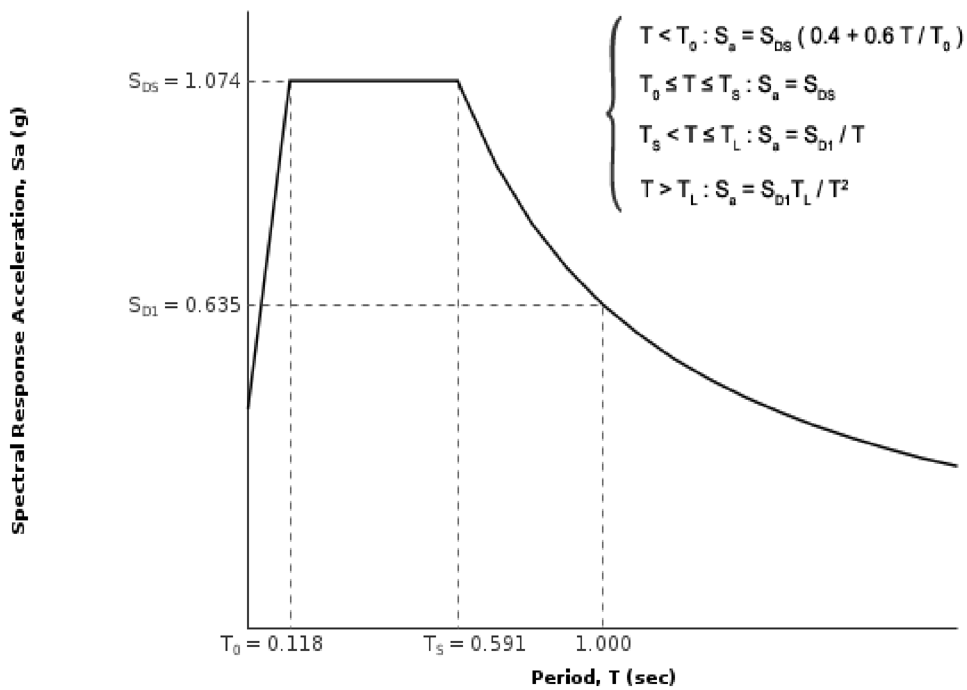
Section 11.4.4 — Design Spectral Acceleration Parameters

| | |
|---|---|
| **Equation (11.4–3):** | $S_{DS} = ⅔\, S_{MS} = ⅔ \times 1.611 = 1.074$ g |
| **Equation (11.4–4):** | $S_{D1} = ⅔\, S_{M1} = ⅔ \times 0.953 = 0.635$ g |

Section 11.4.5 — Design Response Spectrum

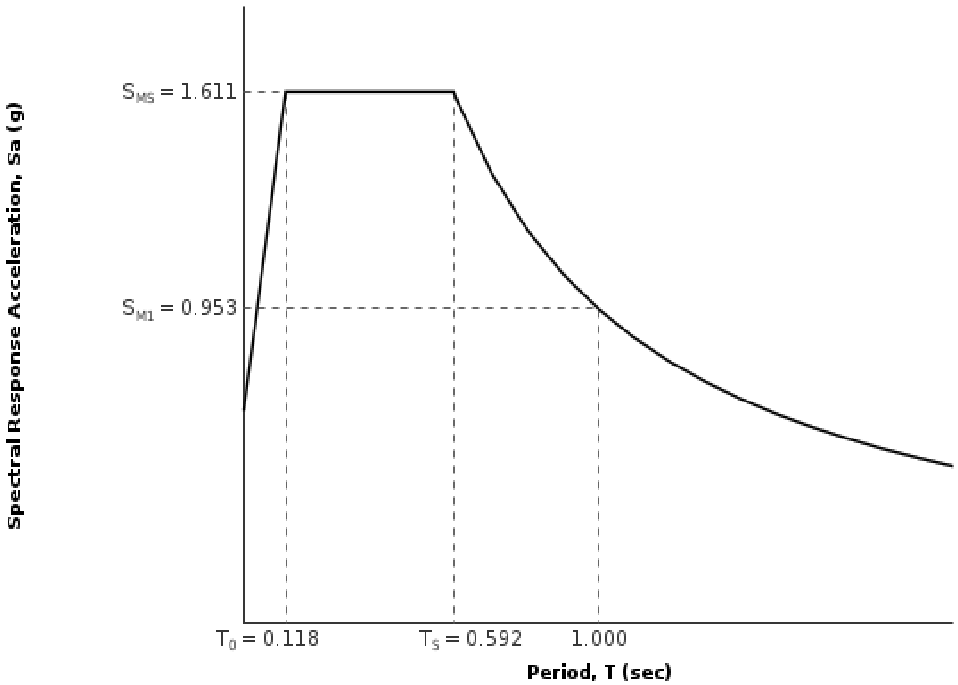
| | |
|---|---|
| **From Figure 22-12** [3] | $T_L$ = 8 seconds |

Figure 11.4–1: Design Response Spectrum



## Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake ($MCE_R$) Response Spectrum

The $MCE_R$ Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

**From Figure 22-7** [4] PGA = 0.617

**Equation (11.8–1):** $PGA_M = F_{PGA} PGA = 1.000 \times 0.617 = 0.617$ g

Table 11.8–1: Site Coefficient $F_{PGA}$

| Site Class | Mapped MCE Geometric Mean Peak Ground Acceleration, PGA | | | | |
|---|---|---|---|---|---|
| | PGA ≤ 0.10 | PGA = 0.20 | PGA = 0.30 | PGA = 0.40 | PGA ≥ 0.50 |
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| C | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 |
| D | 1.6 | 1.4 | 1.2 | 1.1 | $\boxed{1.0}$ |
| E | 2.5 | 1.7 | 1.2 | 0.9 | 0.9 |
| F | See Section 11.4.7 of ASCE 7 | | | | |

Note: Use straight–line interpolation for intermediate values of PGA

**For Site Class = D and PGA = 0.617 g, $F_{PGA}$ = 1.000**

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

**From Figure 22-17** [5] $C_{RS}$ = 0.993

**From Figure 22-18** [6] $C_{R1}$ = 0.995

## Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

| VALUE OF $S_{DS}$ | RISK CATEGORY | | |
|---|---|---|---|
| | I or II | III | IV |
| $S_{DS} < 0.167g$ | A | A | A |
| $0.167g \le S_{DS} < 0.33g$ | B | B | C |
| $0.33g \le S_{DS} < 0.50g$ | C | C | D |
| $0.50g \le S_{DS}$ | D | D | D |

**For Risk Category = I and $S_{DS}$ = 1.074 g, Seismic Design Category = D**

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

| VALUE OF $S_{D1}$ | RISK CATEGORY | | |
|---|---|---|---|
| | I or II | III | IV |
| $S_{D1} < 0.067g$ | A | A | A |
| $0.067g \le S_{D1} < 0.133g$ | B | B | C |
| $0.133g \le S_{D1} < 0.20g$ | C | C | D |
| $0.20g \le S_{D1}$ | D | D | D |

**For Risk Category = I and $S_{D1}$ = 0.635 g, Seismic Design Category = D**

Note: When $S_1$ is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

---

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

## References


1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

# APPENDIX B
UPDATED LIQUEFACTION ANALYSES

GROUP DELTA CONSULTANTS

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Rey -Parcel 44 |
| Project No. | LA-1049 |
| Location | Marina Del Rey |
| Exploration No. | CPT-12-01 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 12.00 ft |
| GWT Elev. During Test | -7.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ $(\sigma_v/\sigma_v')$ $r_d$

+++ FS = $(CRR_{7.5}/CSR)$ MSF $K_\sigma$ $K_{\alpha}$ —>> where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 19.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 7.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 7.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.52 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.01 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.53 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 82.70 | 0.92 | 1.11 | sand to silty sand | 11.0 | 1.00 | 21 | 60 | 60 | 60 | 1.49 | 1.00 | 477.47 | 0.999 | N/A | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | 39.3 | 0.037 | 0.028 | 0.00 | 0.53 |
| 1.50 | 80.20 | 1.95 | 2.43 | sandy silt to clayey silt | 10.0 | 1.00 | 32 | 180 | 180 | 180 | 1.91 | 1.20 | 321.50 | 0.997 | N/A | 0.402 | N/A | N/A | NO | N/A | N/A | N/A | 70.4 | N/A | N/A | N/A | 0.53 |
| 2.50 | 74.32 | 0.91 | 1.23 | sand to silty sand | 9.0 | 1.00 | 19 | 300 | 300 | 300 | 1.77 | 1.08 | 207.99 | 0.994 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 35.6 | 0.084 | 0.073 | 0.01 | 0.52 |
| 3.50 | 99.98 | 0.92 | 0.92 | sand to silty sand | 8.0 | 1.00 | 25 | 420 | 420 | 420 | 1.64 | 1.00 | 218.18 | 0.992 | N/A | 0.400 | N/A | N/A | NO | N/A | N/A | N/A | 47.0 | 0.090 | 0.000 | 0.00 | 0.52 |
| 4.50 | 55.88 | 0.92 | 1.64 | silty sand to sandy silt | 7.0 | 1.00 | 19 | 540 | 540 | 540 | 2.03 | 1.35 | 144.82 | 0.990 | N/A | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 43.0 | 0.105 | 0.000 | 0.00 | 0.52 |
| 5.50 | 31.42 | 0.58 | 1.83 | sandy silt to clayey silt | 6.0 | 1.66 | 21 | 660 | 660 | 660 | 1.97 | 1.27 | 114.67 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 47.4 | N/A | N/A | N/A | 0.52 |
| 6.50 | 13.12 | 0.39 | 2.96 | silty clay to clay | 5.0 | 1.00 | 9 | 780 | 780 | 780 | 2.66 | N/A | N/A | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 7.50 | 16.98 | 0.65 | 3.79 | silty clay to clay | 4.0 | 1.00 | 11 | 900 | 869 | 900 | 2.67 | N/A | N/A | 0.983 | N/A | 0.410 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 8.50 | 35.95 | 1.08 | 2.99 | clayey silt to silty clay | 3.0 | 1.00 | 18 | 1,020 | 926 | 1,020 | 2.44 | 2.48 | 130.95 | 0.980 | 1.000 | 0.435 | 0.289 | 0.853 | YES | 2.8 | 28.0 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.52 |
| 9.50 | 23.00 | 0.57 | 2.49 | clayey silt to silty clay | 2.0 | 1.00 | 12 | 1,140 | 984 | 1,140 | 2.54 | 3.00 | 98.24 | 0.978 | 1.000 | 0.457 | 0.168 | 0.473 | YES | 2.8 | 18.0 | 979 | N/A | N/A | 0.000 | 0.00 | 0.52 |
| 10.50 | 13.73 | 0.44 | 3.22 | silty clay to clay | 1.0 | 1.00 | 9 | 1,260 | 1,042 | 1,260 | 2.75 | N/A | N/A | 0.976 | N/A | 0.476 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 11.50 | 23.92 | 0.75 | 3.14 | clayey silt to silty clay | 0.0 | 1.00 | 12 | 1,380 | 1,099 | 1,380 | 2.57 | 3.13 | 117.31 | 0.973 | 1.000 | 0.492 | 0.230 | 0.600 | YES | 2.8 | 17.2 | 893 | N/A | N/A | 0.000 | 0.00 | 0.52 |
| 12.50 | 43.82 | 1.37 | 3.11 | clayey silt to silty clay | -1.0 | 1.00 | 22 | 1,500 | 1,157 | 1,500 | 2.43 | 2.42 | 139.45 | 0.971 | 1.000 | 0.507 | 0.332 | 0.841 | YES | 2.8 | 28.1 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.52 |
| 13.50 | 25.42 | 1.15 | 4.51 | clay | -2.0 | 1.00 | 25 | 1,620 | 1,214 | 1,620 | 2.68 | N/A | N/A | 0.969 | N/A | 0.521 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 14.50 | 16.77 | 0.38 | 2.26 | clayey silt to silty clay | -3.0 | 1.00 | 8 | 1,740 | 1,272 | 1,740 | 2.64 | N/A | N/A | 0.966 | N/A | 0.533 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 15.50 | 10.50 | 0.18 | 1.71 | clayey silt to silty clay | -4.0 | 1.00 | 5 | 1,860 | 1,330 | 1,860 | 2.76 | N/A | N/A | 0.964 | N/A | 0.543 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 16.50 | 11.13 | 0.26 | 2.31 | clayey silt to silty clay | -5.0 | 1.00 | 6 | 1,980 | 1,387 | 1,980 | 2.82 | N/A | N/A | 0.962 | N/A | 0.553 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 17.50 | 13.90 | 0.40 | 2.83 | clayey silt to silty clay | -6.0 | 1.00 | 7 | 2,100 | 1,445 | 2,100 | 2.80 | N/A | N/A | 0.959 | N/A | 0.562 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 18.50 | 16.47 | 0.67 | 4.03 | silty clay to clay | -7.0 | 1.00 | 11 | 2,220 | 1,502 | 2,220 | 2.85 | N/A | N/A | 0.957 | N/A | 0.570 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 19.50 | 14.73 | 0.55 | 3.69 | silty clay to clay | -8.0 | 1.00 | 10 | 2,340 | 1,560 | 2,309 | 2.87 | N/A | N/A | 0.955 | N/A | 0.577 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 20.50 | 71.61 | 0.69 | 0.97 | sand to silty sand | -9.0 | 1.00 | 18 | 2,460 | 1,618 | 2,366 | 1.98 | 1.28 | 101.83 | 0.952 | 1.000 | 0.584 | 0.178 | 0.392 | YES | 1.3 | 17.8 | 954 | 19.7 | N/A | 1.572 | 0.19 | 0.33 |
| 21.50 | 72.32 | 0.75 | 1.03 | sand to silty sand | -10.0 | 1.66 | 30 | 2,580 | 1,675 | 2,424 | 1.69 | 1.03 | 135.33 | 0.950 | 1.000 | 0.590 | 0.310 | 0.677 | YES | 1.3 | 28.5 | 1,200 | 31.0 | N/A | 0.574 | 0.07 | 0.26 |
| 22.50 | 14.52 | 0.35 | 2.38 | clayey silt to silty clay | -11.0 | 1.00 | 7 | 2,700 | 1,733 | 2,482 | 2.79 | N/A | N/A | 0.948 | N/A | 0.595 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.26 |
| 23.50 | 8.30 | 0.22 | 2.58 | silty clay to clay | -12.0 | 1.00 | 6 | 2,820 | 1,790 | 2,539 | 3.05 | N/A | N/A | 0.945 | N/A | 0.600 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.26 |
| 24.50 | 10.47 | 0.28 | 2.64 | silty clay to clay | -13.0 | 1.00 | 7 | 2,940 | 1,848 | 2,597 | 2.97 | N/A | N/A | 0.943 | N/A | 0.605 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.26 |
| 25.50 | 12.42 | 0.43 | 3.44 | silty clay to clay | -14.0 | 1.00 | 8 | 3,060 | 1,906 | 2,654 | 2.98 | N/A | N/A | 0.941 | N/A | 0.609 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.26 |
| 26.50 | 12.37 | 0.38 | 3.04 | silty clay to clay | -15.0 | 1.00 | 8 | 3,180 | 1,963 | 2,712 | 2.96 | N/A | N/A | 0.938 | N/A | 0.612 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.26 |
| 27.50 | 80.90 | 0.82 | 1.02 | sand to silty sand | -16.0 | 1.00 | 20 | 3,300 | 2,021 | 2,770 | 1.99 | 1.29 | 103.99 | 0.936 | 0.997 | 0.616 | 0.185 | 0.384 | YES | 1.3 | 18.5 | 1,030 | 20.5 | N/A | 1.519 | 0.18 | 0.08 |
| 28.50 | 192.05 | 1.25 | 0.65 | sand | -17.0 | 1.00 | 38 | 3,420 | 2,078 | 2,827 | 1.58 | 1.00 | 188.39 | 0.934 | 0.985 | 0.619 | N/A | N/A | NO | N/A | N/A | N/A | 32.3 | N/A | 0.385 | 0.05 | 0.04 |
| 29.50 | 201.48 | 0.98 | 0.49 | sand | -18.0 | 1.00 | 40 | 3,540 | 2,136 | 2,885 | 1.49 | 1.00 | 194.96 | 0.931 | 0.974 | 0.622 | N/A | N/A | NO | N/A | N/A | N/A | 33.6 | N/A | 0.167 | 0.02 | 0.02 |
| 30.50 | 284.85 | 1.41 | 0.50 | gravelly sand to sand | -19.0 | 1.00 | 47 | 3,660 | 2,194 | 2,942 | 1.38 | 1.00 | 271.99 | 0.926 | 0.964 | 0.622 | N/A | N/A | NO | N/A | N/A | N/A | 39.1 | N/A | 0.016 | 0.00 | 0.01 |
| 31.50 | 502.14 | 3.71 | 0.74 | gravelly sand to sand | -20.0 | 1.00 | 84 | 3,780 | 2,251 | 3,000 | 1.35 | 1.00 | 473.30 | 0.918 | 0.954 | 0.621 | N/A | N/A | NO | N/A | N/A | N/A | 68.3 | N/A | 0.000 | 0.00 | 0.01 |
| 32.50 | 297.43 | 1.89 | 0.64 | gravelly sand to sand | -21.0 | 1.00 | 50 | 3,900 | 2,309 | 3,058 | 1.45 | 1.00 | 276.83 | 0.909 | 0.944 | 0.619 | N/A | N/A | NO | N/A | N/A | N/A | 40.1 | N/A | 0.000 | 0.00 | 0.01 |
| 33.50 | 368.45 | 2.25 | 0.61 | gravelly sand to sand | -22.0 | 1.00 | 61 | 4,020 | 2,366 | 3,115 | 1.38 | 1.00 | 338.73 | 0.901 | 0.935 | 0.617 | N/A | N/A | NO | N/A | N/A | N/A | 49.2 | N/A | 0.000 | 0.00 | 0.01 |
| 34.50 | 265.90 | 1.22 | 0.46 | gravelly sand to sand | -23.0 | 1.00 | 44 | 4,140 | 2,424 | 3,173 | 1.40 | 1.00 | 241.53 | 0.893 | 0.926 | 0.615 | N/A | N/A | NO | N/A | N/A | N/A | 35.2 | N/A | 0.086 | 0.01 | 0.00 |
| 35.50 | 459.55 | 4.08 | 0.89 | gravelly sand to sand | -24.0 | 1.00 | 77 | 4,260 | 2,482 | 3,230 | 1.45 | 1.00 | 412.56 | 0.885 | 0.917 | 0.612 | N/A | N/A | NO | N/A | N/A | N/A | 60.3 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 562.73 | 4.95 | 0.88 | gravelly sand to sand | -25.0 | 1.00 | 94 | 4,380 | 2,539 | 3,288 | 1.40 | 1.00 | 499.42 | 0.877 | 0.909 | 0.610 | N/A | N/A | NO | N/A | N/A | N/A | 73.1 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 525.83 | 2.44 | 0.46 | gravelly sand to sand | -26.0 | 1.00 | 88 | 4,500 | 2,597 | 3,346 | 1.20 | 1.00 | 461.47 | 0.869 | 0.901 | 0.607 | N/A | N/A | NO | N/A | N/A | N/A | 67.8 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 541.90 | 1.87 | 0.35 | gravelly sand to sand | -27.0 | 1.00 | 90 | 4,620 | 2,654 | 3,403 | 1.10 | 1.00 | 470.38 | 0.861 | 0.893 | 0.604 | N/A | N/A | NO | N/A | N/A | N/A | 69.2 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 688.02 | 1.81 | 0.26 | gravelly sand to sand | -28.0 | 1.00 | 115 | 4,740 | 2,712 | 3,461 | 0.95 | 1.00 | 590.84 | 0.852 | 0.885 | 0.600 | N/A | N/A | NO | N/A | N/A | N/A | 87.2 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 526.25 | 2.13 | 0.41 | gravelly sand to sand | -29.0 | 1.00 | 88 | 4,860 | 2,770 | 3,518 | 1.17 | 1.00 | 447.20 | 0.844 | 0.878 | 0.597 | N/A | N/A | NO | N/A | N/A | N/A | 66.1 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 467.60 | 2.31 | 0.49 | gravelly sand to sand | -30.0 | 1.00 | 78 | 4,980 | 2,827 | 3,576 | 1.27 | 1.00 | 393.29 | 0.836 | 0.871 | 0.594 | N/A | N/A | NO | N/A | N/A | N/A | 58.3 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 484.78 | 3.09 | 0.64 | gravelly sand to sand | -31.0 | 1.00 | 81 | 5,100 | 2,885 | 3,634 | 1.34 | 1.00 | 403.65 | 0.828 | 0.864 | 0.590 | N/A | N/A | NO | N/A | N/A | N/A | 59.9 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 485.45 | 3.32 | 0.68 | gravelly sand to sand | -32.0 | 1.00 | 81 | 5,220 | 2,942 | 3,691 | 1.37 | 1.00 | 400.23 | 0.820 | 0.857 | 0.586 | N/A | N/A | NO | N/A | N/A | N/A | 59.6 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 561.23 | 2.80 | 0.50 | gravelly sand to sand | -33.0 | 1.00 | 94 | 5,340 | 3,000 | 3,749 | 1.23 | 1.00 | 458.25 | 0.812 | 0.850 | 0.582 | N/A | N/A | NO | N/A | N/A | N/A | 68.3 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 475.50 | 2.05 | 0.43 | gravelly sand to sand | -34.0 | 1.00 | 79 | 5,460 | 3,058 | 3,806 | 1.23 | 1.00 | 384.57 | 0.804 | 0.844 | 0.578 | N/A | N/A | NO | N/A | N/A | N/A | 57.4 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 327.37 | 2.66 | 0.81 | sand | -35.0 | 1.00 | 65 | 5,580 | 3,115 | 3,864 | 1.55 | 1.00 | 262.31 | 0.795 | 0.838 | 0.574 | N/A | N/A | NO | N/A | N/A | N/A | 47.1 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 450.90 | 3.10 | 0.69 | gravelly sand to sand | -36.0 | 1.00 | 75 | 5,700 | 3,173 | 3,922 | 1.40 | 1.00 | 358.00 | 0.787 | 0.831 | 0.570 | N/A | N/A | NO | N/A | N/A | N/A | 53.7 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 561.48 | 3.38 | 0.60 | gravelly sand to sand | -37.0 | 1.00 | 94 | 5,820 | 3,230 | 3,979 | 1.30 | 1.00 | 441.80 | 0.779 | 0.825 | 0.566 | N/A | N/A | NO | N/A | N/A | N/A | 66.3 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 480.37 | 4.52 | 0.94 | sand | -38.0 | 1.00 | 96 | 5,940 | 3,288 | 4,037 | 1.49 | 1.00 | 374.65 | 0.771 | 0.820 | 0.561 | N/A | N/A | NO | N/A | N/A | N/A | 67.6 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 893 |
| avg= | 1,065 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-02 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 12.00 ft |
| GWT Elev. During Test | 1.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ $(\sigma_v/\sigma_v')$ $r_d$

+++ FS = $(CRR_{7.5}/CSR)$ MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 11.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 7.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 15.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 2.03 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 2.03 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 16.85 | 0.36 | 2.14 | clayey silt to silty clay |
| 6.50 | 18.73 | 0.45 | 2.39 | clayey silt to silty clay |
| 7.50 | 29.08 | 0.81 | 2.78 | sandy silt to clayey silt |
| 8.50 | 21.27 | 0.57 | 2.68 | clayey silt to silty clay |
| 9.50 | 16.72 | 0.37 | 2.22 | clayey silt to silty clay |
| 10.50 | 14.97 | 0.42 | 2.79 | clayey silt to silty clay |
| 11.50 | 30.78 | 0.76 | 2.47 | sandy silt to clayey silt |
| 12.50 | 46.73 | 0.48 | 1.02 | silty sand to sandy silt |
| 13.50 | 14.47 | 0.30 | 2.05 | clayey silt to silty clay |
| 14.50 | 9.95 | 0.21 | 2.09 | clayey silt to silty clay |
| 15.50 | 14.48 | 0.34 | 2.36 | clayey silt to silty clay |
| 16.50 | 10.20 | 0.25 | 2.41 | silty clay to clay |
| 17.50 | 22.70 | 0.52 | 2.30 | sandy silt to clayey silt |
| 18.50 | 70.55 | 0.54 | 0.77 | sand to silty sand |
| 19.50 | 40.70 | 0.90 | 2.19 | sandy silt to clayey silt |
| 20.50 | 24.31 | 0.40 | 1.62 | sandy silt to clayey silt |
| 21.50 | 9.52 | 0.26 | 2.70 | silty clay to clay |
| 22.50 | 15.20 | 0.45 | 2.92 | clayey silt to silty clay |
| 23.50 | 16.67 | 0.52 | 3.10 | clayey silt to silty clay |
| 24.50 | 17.17 | 0.61 | 3.53 | silty clay to clay |
| 25.50 | 16.30 | 0.47 | 2.87 | clayey silt to silty clay |
| 26.50 | 20.70 | 0.52 | 2.48 | clayey silt to silty clay |
| 27.50 | 37.23 | 0.52 | 1.39 | silty sand to sandy silt |
| 28.50 | 65.62 | 0.63 | 0.96 | sand to silty sand |
| 29.50 | 89.40 | 0.94 | 1.05 | sand to silty sand |
| 30.50 | 147.55 | 1.08 | 0.73 | sand |
| 31.50 | 170.69 | 0.99 | 0.58 | sand |
| 32.50 | 200.92 | 1.24 | 0.62 | sand |
| 33.50 | 276.43 | 0.97 | 0.35 | gravelly sand to sand |
| 34.50 | 218.78 | 1.20 | 0.55 | sand |
| 35.50 | 181.30 | 1.36 | 0.75 | sand |
| 36.50 | 138.50 | 1.11 | 0.80 | sand |
| 37.50 | 119.47 | 0.97 | 0.81 | sand to silty sand |
| 38.50 | 220.48 | 1.16 | 0.52 | sand |
| 39.50 | 540.07 | 1.75 | 0.32 | gravelly sand to sand |
| 40.50 | 588.00 | 1.72 | 0.29 | gravelly sand to sand |
| 41.50 | 600.37 | 1.88 | 0.31 | gravelly sand to sand |
| 42.50 | 572.72 | 2.17 | 0.38 | gravelly sand to sand |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
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| | | | | #N/A |
| | | | | #N/A |

**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.50 | 6.0 | 1.00 | 8 | 660 | 660 | 660 | 2.54 | 2.97 | 86.98 | 0.987 | N/A | 0.398 | N/A | N/A | NO |
| 6.50 | 5.0 | 1.00 | 9 | 780 | 780 | 780 | 2.56 | 3.09 | 92.81 | 0.985 | N/A | 0.397 | N/A | N/A | NO |
| 7.50 | 4.0 | 1.00 | 12 | 900 | 869 | 900 | 2.47 | 2.64 | 116.59 | 0.983 | 1.000 | 0.410 | 0.227 | 0.712 | YES |
| 8.50 | 3.0 | 1.00 | 11 | 1,020 | 926 | 1,020 | 2.58 | 3.20 | 100.06 | 0.980 | 1.000 | 0.435 | 0.173 | 0.511 | YES |
| 9.50 | 2.0 | 1.00 | 8 | 1,140 | 984 | 1,140 | 2.56 | 3.11 | 88.39 | 0.978 | 1.000 | 0.457 | 0.144 | 0.406 | YES |
| 10.50 | 1.0 | 1.00 | 7 | 1,260 | 1,042 | 1,260 | 2.68 | N/A | N/A | 0.976 | N/A | 0.476 | N/A | N/A | NO |
| 11.50 | 0.0 | 1.00 | 12 | 1,380 | 1,099 | 1,349 | 2.46 | 2.59 | 107.40 | 0.973 | 1.000 | 0.492 | 0.195 | 0.509 | YES |
| 12.50 | -1.0 | 1.66 | 26 | 1,500 | 1,157 | 1,406 | 1.78 | 1.09 | 111.15 | 0.971 | 1.000 | 0.507 | 0.208 | 0.526 | YES |
| 13.50 | -2.0 | 1.00 | 7 | 1,620 | 1,214 | 1,464 | 2.65 | N/A | N/A | 0.969 | N/A | 0.521 | N/A | N/A | NO |
| 14.50 | -3.0 | 1.00 | 5 | 1,740 | 1,272 | 1,522 | 2.81 | N/A | N/A | 0.966 | N/A | 0.533 | N/A | N/A | NO |
| 15.50 | -4.0 | 1.00 | 7 | 1,860 | 1,330 | 1,579 | 2.71 | N/A | N/A | 0.964 | N/A | 0.543 | N/A | N/A | NO |
| 16.50 | -5.0 | 1.00 | 7 | 1,980 | 1,387 | 1,637 | 2.86 | N/A | N/A | 0.962 | N/A | 0.553 | N/A | N/A | NO |
| 17.50 | -6.0 | 1.00 | 9 | 2,100 | 1,445 | 1,694 | 2.57 | 3.14 | 91.10 | 0.959 | 1.000 | 0.562 | 0.150 | 0.344 | YES |
| 18.50 | -7.0 | 1.00 | 18 | 2,220 | 1,502 | 1,752 | 1.92 | 1.20 | 98.02 | 0.957 | 1.000 | 0.570 | 0.168 | 0.378 | YES |
| 19.50 | -8.0 | 1.00 | 16 | 2,340 | 1,560 | 1,810 | 2.40 | 2.30 | 105.92 | 0.955 | 1.000 | 0.577 | 0.191 | 0.424 | YES |
| 20.50 | -9.0 | 1.66 | 16 | 2,460 | 1,618 | 1,867 | 2.19 | 1.65 | 73.94 | 0.952 | 1.000 | 0.584 | 0.118 | 0.259 | YES |
| 21.50 | -10.0 | 1.00 | 6 | 2,580 | 1,675 | 1,925 | 2.98 | N/A | N/A | 0.950 | N/A | 0.590 | N/A | N/A | NO |
| 22.50 | -11.0 | 1.00 | 8 | 2,700 | 1,733 | 1,982 | 2.83 | N/A | N/A | 0.948 | N/A | 0.595 | N/A | N/A | NO |
| 23.50 | -12.0 | 1.00 | 8 | 2,820 | 1,790 | 2,040 | 2.82 | N/A | N/A | 0.945 | N/A | 0.600 | N/A | N/A | NO |
| 24.50 | -13.0 | 1.00 | 11 | 2,940 | 1,848 | 2,098 | 2.86 | N/A | N/A | 0.943 | N/A | 0.605 | N/A | N/A | NO |
| 25.50 | -14.0 | 1.00 | 8 | 3,060 | 1,906 | 2,155 | 2.83 | N/A | N/A | 0.941 | N/A | 0.609 | N/A | N/A | NO |
| 26.50 | -15.0 | 1.00 | 10 | 3,180 | 1,963 | 2,213 | 2.71 | N/A | N/A | 0.938 | N/A | 0.612 | N/A | N/A | NO |
| 27.50 | -16.0 | 1.00 | 12 | 3,300 | 2,021 | 2,270 | 2.35 | 2.13 | 78.80 | 0.936 | 0.997 | 0.616 | 0.126 | 0.261 | YES |
| 28.50 | -17.0 | 1.00 | 16 | 3,420 | 2,078 | 2,328 | 2.06 | 1.38 | 89.09 | 0.934 | 0.989 | 0.619 | 0.146 | 0.299 | YES |
| 29.50 | -18.0 | 1.00 | 22 | 3,540 | 2,136 | 2,386 | 1.98 | 1.27 | 110.09 | 0.931 | 0.978 | 0.622 | 0.204 | 0.412 | YES |
| 30.50 | -19.0 | 1.00 | 30 | 3,660 | 2,194 | 2,443 | 1.71 | 1.05 | 147.38 | 0.926 | 0.965 | 0.622 | 0.378 | 0.752 | YES |
| 31.50 | -20.0 | 1.00 | 34 | 3,780 | 2,251 | 2,501 | 1.60 | 1.00 | 160.88 | 0.918 | 0.954 | 0.621 | N/A | N/A | NO |
| 32.50 | -21.0 | 1.00 | 40 | 3,900 | 2,309 | 2,558 | 1.57 | 1.00 | 187.00 | 0.909 | 0.944 | 0.619 | N/A | N/A | NO |
| 33.50 | -22.0 | 1.00 | 46 | 4,020 | 2,366 | 2,616 | 1.31 | 1.00 | 254.13 | 0.901 | 0.935 | 0.617 | N/A | N/A | NO |
| 34.50 | -23.0 | 1.00 | 44 | 4,140 | 2,424 | 2,674 | 1.52 | 1.00 | 198.73 | 0.893 | 0.926 | 0.615 | N/A | N/A | NO |
| 35.50 | -24.0 | 1.00 | 36 | 4,260 | 2,482 | 2,731 | 1.67 | 1.02 | 165.65 | 0.885 | 0.917 | 0.612 | N/A | N/A | NO |
| 36.50 | -25.0 | 1.00 | 28 | 4,380 | 2,539 | 2,789 | 1.78 | 1.09 | 134.59 | 0.877 | 0.917 | 0.610 | 0.307 | 0.593 | YES |
| 37.50 | -26.0 | 1.00 | 30 | 4,500 | 2,597 | 2,846 | 1.84 | 1.14 | 119.39 | 0.869 | 0.907 | 0.607 | 0.238 | 0.457 | YES |
| 38.50 | -27.0 | 1.00 | 44 | 4,620 | 2,654 | 2,904 | 1.52 | 1.00 | 191.38 | 0.861 | 0.893 | 0.604 | N/A | N/A | NO |
| 39.50 | -28.0 | 1.00 | 90 | 4,740 | 2,712 | 2,962 | 1.09 | 1.00 | 463.79 | 0.852 | 0.885 | 0.600 | N/A | N/A | NO |
| 40.50 | -29.0 | 1.00 | 98 | 4,860 | 2,770 | 3,019 | 1.03 | 1.00 | 499.67 | 0.844 | 0.878 | 0.597 | N/A | N/A | NO |
| 41.50 | -30.0 | 1.00 | 100 | 4,980 | 2,827 | 3,077 | 1.05 | 1.00 | 504.96 | 0.836 | 0.871 | 0.594 | N/A | N/A | NO |
| 42.50 | -31.0 | 1.00 | 95 | 5,100 | 2,885 | 3,134 | 1.13 | 1.00 | 476.87 | 0.828 | 0.864 | 0.590 | N/A | N/A | NO |

| Soil Depth During Test (ft) | RESIDUAL STRENGTH *: SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | GROUND SETTLEMENT **: Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 5.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.03 |
| 6.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.03 |
| 7.50 | 2.8 | 20.1 | 1,200 | 25.8 | N/A | 0.870 | 0.10 | 1.93 |
| 8.50 | 2.8 | 17.7 | 944 | N/A | N/A | 0.000 | 0.00 | 1.93 |
| 9.50 | 2.8 | 13.9 | 581 | N/A | N/A | 0.000 | 0.00 | 1.93 |
| 10.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.93 |
| 11.50 | 2.8 | 17.8 | 954 | 23.0 | N/A | 1.299 | 0.16 | 1.77 |
| 12.50 | 2.8 | 33.6 | 1,200 | 41.9 | N/A | 0.000 | 0.00 | 1.77 |
| 13.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.77 |
| 14.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.77 |
| 15.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.77 |
| 16.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.77 |
| 17.50 | 2.8 | 12.7 | 485 | 16.8 | N/A | 1.782 | 0.21 | 1.56 |
| 18.50 | 1.3 | 20.2 | 1,200 | 22.2 | N/A | 1.389 | 0.17 | 1.39 |
| 19.50 | 2.8 | 19.9 | 1,177 | 25.5 | N/A | 1.151 | 0.14 | 1.25 |
| 20.50 | 2.8 | 19.5 | 1,130 | 25.0 | N/A | 1.192 | 0.14 | 1.11 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.11 |
| 22.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.11 |
| 23.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.11 |
| 24.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.11 |
| 25.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.11 |
| 26.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.11 |
| 27.50 | 2.8 | 14.4 | 631 | 19.0 | N/A | 1.629 | 0.20 | 0.91 |
| 28.50 | 1.3 | 16.5 | 827 | 18.4 | N/A | 1.669 | 0.20 | 0.71 |
| 29.50 | 1.3 | 21.8 | 1,200 | 23.9 | N/A | 1.270 | 0.15 | 0.56 |
| 30.50 | 0.0 | 26.7 | 1,200 | 26.7 | N/A | 1.072 | 0.13 | 0.43 |
| 31.50 | N/A | N/A | N/A | 30.5 | N/A | 0.659 | 0.08 | 0.35 |
| 32.50 | N/A | N/A | N/A | 35.5 | N/A | 0.080 | 0.01 | 0.34 |
| 33.50 | N/A | N/A | N/A | 40.3 | N/A | 0.000 | 0.00 | 0.34 |
| 34.50 | N/A | N/A | N/A | 37.8 | N/A | 0.038 | 0.00 | 0.34 |
| 35.50 | N/A | N/A | N/A | 31.0 | N/A | 0.592 | 0.07 | 0.27 |
| 36.50 | 0.0 | 23.5 | 1,200 | 23.5 | N/A | 1.306 | 0.16 | 0.11 |
| 37.50 | 1.3 | 26.4 | 1,200 | 28.7 | N/A | 0.871 | 0.10 | 0.01 |
| 38.50 | N/A | N/A | N/A | 36.6 | N/A | 0.059 | 0.01 | 0.00 |
| 39.50 | N/A | N/A | N/A | 74.0 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | N/A | N/A | N/A | 79.8 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | N/A | N/A | N/A | 80.7 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | N/A | N/A | N/A | 76.2 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 485 |
| avg= | 1,008 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-03 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 10.00 ft |
| GWT Elev. During Test | 8.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 2.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 5.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 11.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.76 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.76 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 0.50 | 33.47 | 0.48 | 1.43 | silty sand to sandy silt |
| 1.50 | 16.05 | 0.45 | 2.80 | clayey silt to silty clay |
| 2.50 | 21.75 | 0.64 | 2.96 | clayey silt to silty clay |
| 3.50 | 25.03 | 0.62 | 2.46 | sandy silt to clayey silt |
| 4.50 | 24.42 | 0.65 | 2.67 | clayey silt to silty clay |
| 5.50 | 19.48 | 0.49 | 2.52 | clayey silt to silty clay |
| 6.50 | 27.47 | 0.60 | 2.17 | sandy silt to clayey silt |
| 7.50 | 40.65 | 0.90 | 2.22 | sandy silt to clayey silt |
| 8.50 | 98.27 | 0.81 | 0.82 | sand to silty sand |
| 9.50 | 91.37 | 0.41 | 0.45 | sand to silty sand |
| 10.50 | 18.09 | 0.50 | 2.72 | clayey silt to silty clay |
| 11.50 | 8.22 | 0.19 | 2.30 | silty clay to clay |
| 12.50 | 7.10 | 0.18 | 2.44 | silty clay to clay |
| 13.50 | 17.28 | 0.22 | 1.28 | sandy silt to clayey silt |
| 14.50 | 64.92 | 0.37 | 0.57 | sand to silty sand |
| 15.50 | 45.30 | 0.59 | 1.29 | silty sand to sandy silt |
| 16.50 | 55.42 | 0.67 | 1.21 | silty sand to sandy silt |
| 17.50 | 16.58 | 0.48 | 2.85 | clayey silt to silty clay |
| 18.50 | 16.17 | 0.33 | 2.03 | clayey silt to silty clay |
| 19.50 | 18.02 | 0.50 | 2.75 | clayey silt to silty clay |
| 20.50 | 23.31 | 0.73 | 3.09 | clayey silt to silty clay |
| 21.50 | 23.30 | 0.93 | 3.97 | silty clay to clay |
| 22.50 | 16.67 | 0.50 | 2.94 | clayey silt to silty clay |
| 23.50 | 19.87 | 0.52 | 2.57 | clayey silt to silty clay |
| 24.50 | 31.32 | 0.91 | 2.88 | clayey silt to silty clay |
| 25.50 | 99.28 | 1.38 | 1.38 | sand to silty sand |
| 26.50 | 191.17 | 1.13 | 0.59 | sand |
| 27.50 | 254.68 | 1.25 | 0.49 | sand |
| 28.50 | 340.82 | 1.45 | 0.43 | gravelly sand to sand |
| 29.50 | 390.80 | 2.63 | 0.67 | gravelly sand to sand |
| 30.50 | 371.22 | 1.70 | 0.46 | gravelly sand to sand |
| 31.50 | 282.26 | 0.91 | 0.32 | gravelly sand to sand |
| 32.50 | 304.52 | 1.36 | 0.45 | gravelly sand to sand |
| 33.50 | 162.30 | 1.75 | 1.08 | sand |
| 34.50 | 118.78 | 0.87 | 0.73 | sand |
| 35.50 | 58.62 | 1.08 | 1.84 | silty sand to sandy silt |
| 36.50 | 205.97 | 1.94 | 0.94 | sand |
| 37.50 | 476.20 | 1.56 | 0.33 | gravelly sand to sand |
| 38.50 | 498.68 | 1.74 | 0.35 | gravelly sand to sand |
| 39.50 | 535.92 | 2.03 | 0.38 | gravelly sand to sand |
| 40.50 | 508.52 | 1.95 | 0.38 | gravelly sand to sand |
| 41.50 | 492.79 | 1.48 | 0.30 | gravelly sand to sand |
| 42.50 | 741.82 | 1.03 | 0.14 | gravelly sand to sand |
| | | | | #N/A |
| | | | | #N/A |
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| | | | | #N/A |

**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.50 | 9.0 | 1.66 | 18 | 60 | 60 | 60 | 1.51 | 1.00 | 319.93 | 0.999 | N/A | 0.403 | N/A | N/A | NO |
| 1.50 | 8.0 | 1.00 | 8 | 180 | 180 | 180 | 2.41 | 2.37 | 126.60 | 0.997 | N/A | 0.402 | N/A | N/A | NO |
| 2.50 | 7.0 | 1.00 | 11 | 300 | 300 | 269 | 2.41 | 2.37 | 133.21 | 0.994 | N/A | 0.401 | N/A | N/A | NO |
| 3.50 | 6.0 | 1.00 | 10 | 420 | 420 | 326 | 2.37 | 2.19 | 119.72 | 0.992 | N/A | 0.400 | N/A | N/A | NO |
| 4.50 | 5.0 | 1.00 | 12 | 540 | 540 | 384 | 2.44 | 2.49 | 117.05 | 0.990 | N/A | 0.399 | N/A | N/A | NO |
| 5.50 | 4.0 | 1.00 | 10 | 660 | 629 | 442 | 2.53 | 2.90 | 100.87 | 0.987 | 1.000 | 0.418 | 0.175 | 0.540 | YES |
| 6.50 | 3.0 | 1.00 | 11 | 780 | 686 | 499 | 2.38 | 2.25 | 105.38 | 0.985 | 1.000 | 0.451 | 0.189 | 0.538 | YES |
| 7.50 | 2.0 | 1.00 | 16 | 900 | 744 | 557 | 2.28 | 1.87 | 124.87 | 0.983 | 1.000 | 0.479 | 0.261 | 0.700 | YES |
| 8.50 | 1.0 | 1.00 | 25 | 1,020 | 802 | 614 | 1.71 | 1.05 | 162.26 | 0.980 | 1.000 | 0.503 | N/A | N/A | NO |
| 9.50 | 0.0 | 1.66 | 38 | 1,140 | 859 | 672 | 1.29 | 1.00 | 230.81 | 0.978 | 1.000 | 0.523 | N/A | N/A | NO |
| 10.50 | -1.0 | 1.66 | 15 | 1,260 | 917 | 730 | 2.33 | 2.05 | 90.51 | 0.976 | 1.000 | 0.540 | 0.149 | 0.354 | YES |
| 11.50 | -2.0 | 1.00 | 5 | 1,380 | 974 | 787 | 2.83 | N/A | N/A | 0.973 | N/A | 0.555 | N/A | N/A | NO |
| 12.50 | -3.0 | 1.00 | 5 | 1,500 | 1,032 | 845 | 2.92 | N/A | N/A | 0.971 | N/A | 0.569 | N/A | N/A | NO |
| 13.50 | -4.0 | 1.00 | 7 | 1,620 | 1,090 | 902 | 2.50 | 2.76 | 64.56 | 0.969 | 1.000 | 0.580 | 0.105 | 0.232 | YES |
| 14.50 | -5.0 | 1.00 | 16 | 1,740 | 1,147 | 960 | 1.82 | 1.12 | 96.37 | 0.966 | 1.000 | 0.591 | 0.163 | 0.355 | YES |
| 15.50 | -6.0 | 1.00 | 15 | 1,860 | 1,205 | 1,018 | 2.17 | 1.59 | 92.99 | 0.964 | 1.000 | 0.600 | 0.155 | 0.332 | YES |
| 16.50 | -7.0 | 1.66 | 31 | 1,980 | 1,262 | 1,075 | 1.78 | 1.09 | 126.08 | 0.962 | 1.000 | 0.608 | 0.266 | 0.563 | YES |
| 17.50 | -8.0 | 1.00 | 8 | 2,100 | 1,320 | 1,133 | 2.72 | N/A | N/A | 0.959 | N/A | 0.615 | N/A | N/A | NO |
| 18.50 | -9.0 | 1.00 | 8 | 2,220 | 1,378 | 1,190 | 2.65 | N/A | N/A | 0.957 | N/A | 0.621 | N/A | N/A | NO |
| 19.50 | -10.0 | 1.00 | 9 | 2,340 | 1,435 | 1,248 | 2.70 | N/A | N/A | 0.955 | N/A | 0.627 | N/A | N/A | NO |
| 20.50 | -11.0 | 1.00 | 12 | 2,460 | 1,493 | 1,306 | 2.65 | N/A | N/A | 0.952 | N/A | 0.632 | N/A | N/A | NO |
| 21.50 | -12.0 | 1.00 | 16 | 2,580 | 1,550 | 1,363 | 2.74 | N/A | N/A | 0.950 | N/A | 0.637 | N/A | N/A | NO |
| 22.50 | -13.0 | 1.00 | 8 | 2,700 | 1,608 | 1,421 | 2.78 | N/A | N/A | 0.948 | N/A | 0.641 | N/A | N/A | NO |
| 23.50 | -14.0 | 1.00 | 10 | 2,820 | 1,666 | 1,478 | 2.69 | N/A | N/A | 0.945 | N/A | 0.645 | N/A | N/A | NO |
| 24.50 | -15.0 | 1.00 | 16 | 2,940 | 1,723 | 1,536 | 2.58 | 3.22 | 108.71 | 0.943 | 1.000 | 0.648 | 0.199 | 0.395 | YES |
| 25.50 | -16.0 | 1.00 | 25 | 3,060 | 1,781 | 1,594 | 1.99 | 1.29 | 135.71 | 0.941 | 1.000 | 0.651 | 0.312 | 0.616 | YES |
| 26.50 | -17.0 | 1.00 | 38 | 3,180 | 1,838 | 1,651 | 1.54 | 1.00 | 199.39 | 0.938 | 1.000 | 0.654 | N/A | N/A | NO |
| 27.50 | -18.0 | 1.00 | 51 | 3,300 | 1,896 | 1,709 | 1.39 | 1.00 | 261.57 | 0.936 | 1.000 | 0.656 | N/A | N/A | NO |
| 28.50 | -19.0 | 1.00 | 57 | 3,420 | 1,954 | 1,766 | 1.26 | 1.00 | 344.84 | 0.934 | 1.000 | 0.659 | N/A | N/A | NO |
| 29.50 | -20.0 | 1.00 | 65 | 3,540 | 2,011 | 1,824 | 1.37 | 1.00 | 389.71 | 0.931 | 0.998 | 0.661 | N/A | N/A | NO |
| 30.50 | -21.0 | 1.00 | 62 | 3,660 | 2,069 | 1,882 | 1.27 | 1.00 | 364.99 | 0.926 | 0.987 | 0.660 | N/A | N/A | NO |
| 31.50 | -22.0 | 1.00 | 47 | 3,780 | 2,126 | 1,939 | 1.26 | 1.00 | 273.74 | 0.918 | 0.976 | 0.657 | N/A | N/A | NO |
| 32.50 | -23.0 | 1.00 | 51 | 3,900 | 2,184 | 1,997 | 1.33 | 1.00 | 291.41 | 0.909 | 0.965 | 0.654 | N/A | N/A | NO |
| 33.50 | -24.0 | 1.00 | 32 | 4,020 | 2,242 | 2,054 | 1.80 | 1.11 | 169.49 | 0.901 | 0.955 | 0.651 | N/A | N/A | NO |
| 34.50 | -25.0 | 1.66 | 39 | 4,140 | 2,299 | 2,112 | 1.49 | 1.00 | 183.43 | 0.893 | 0.946 | 0.648 | N/A | N/A | NO |
| 35.50 | -26.0 | 1.00 | 20 | 4,260 | 2,357 | 2,170 | 2.30 | 1.94 | 104.53 | 0.885 | 0.948 | 0.645 | 0.186 | 0.352 | YES |
| 36.50 | -27.0 | 1.00 | 41 | 4,380 | 2,414 | 2,227 | 1.69 | 1.03 | 193.74 | 0.877 | 0.927 | 0.641 | N/A | N/A | NO |
| 37.50 | -28.0 | 1.00 | 79 | 4,500 | 2,472 | 2,285 | 1.12 | 1.00 | 428.33 | 0.869 | 0.919 | 0.637 | N/A | N/A | NO |
| 38.50 | -29.0 | 1.00 | 83 | 4,620 | 2,530 | 2,342 | 1.12 | 1.00 | 443.42 | 0.861 | 0.910 | 0.633 | N/A | N/A | NO |
| 39.50 | -30.0 | 1.00 | 89 | 4,740 | 2,587 | 2,400 | 1.13 | 1.00 | 471.19 | 0.852 | 0.902 | 0.629 | N/A | N/A | NO |
| 40.50 | -31.0 | 1.00 | 85 | 4,860 | 2,645 | 2,458 | 1.15 | 1.00 | 442.21 | 0.844 | 0.894 | 0.625 | N/A | N/A | NO |
| 41.50 | -32.0 | 1.00 | 82 | 4,980 | 2,702 | 2,515 | 1.09 | 1.00 | 423.94 | 0.836 | 0.887 | 0.621 | N/A | N/A | NO |
| 42.50 | -33.0 | 1.00 | 124 | 5,100 | 2,760 | 2,573 | 0.76 | 1.00 | 631.48 | 0.828 | 0.879 | 0.617 | N/A | N/A | NO |

**RESIDUAL STRENGTH *** / **GROUND SETTLEMENT ****

| Soil Depth During Test (ft) | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 0.50 | N/A | N/A | N/A | 42.7 | 0.036 | 0.000 | 0.00 | 0.76 |
| 1.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 2.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 3.50 | N/A | N/A | N/A | 25.4 | N/A | N/A | N/A | 0.76 |
| 4.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 5.50 | 2.8 | 19.4 | 1,118 | N/A | N/A | 0.000 | 0.00 | 0.76 |
| 6.50 | 2.8 | 21.5 | 1,200 | 27.4 | N/A | 0.724 | 0.09 | 0.67 |
| 7.50 | 2.8 | 30.4 | 1,200 | 38.2 | N/A | 0.023 | 0.00 | 0.67 |
| 8.50 | N/A | N/A | N/A | 46.3 | N/A | 0.000 | 0.00 | 0.67 |
| 9.50 | N/A | N/A | N/A | 69.9 | N/A | 0.000 | 0.00 | 0.67 |
| 10.50 | 2.8 | 27.6 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.67 |
| 11.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.67 |
| 12.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.67 |
| 13.50 | 2.8 | 13.1 | 518 | 17.4 | N/A | 1.746 | 0.21 | 0.46 |
| 14.50 | 1.3 | 24.8 | 1,200 | 27.0 | N/A | 1.045 | 0.13 | 0.33 |
| 15.50 | 2.8 | 24.0 | 1,200 | 30.4 | N/A | 0.661 | 0.08 | 0.25 |
| 16.50 | 2.8 | 44.5 | 1,200 | 55.1 | N/A | 0.000 | 0.00 | 0.25 |
| 17.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 18.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 19.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 20.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 22.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 23.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 24.50 | 2.8 | 20.7 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.25 |
| 25.50 | 1.3 | 29.1 | 1,200 | 31.6 | N/A | 0.542 | 0.06 | 0.19 |
| 26.50 | N/A | N/A | N/A | 42.1 | N/A | 0.000 | 0.00 | 0.19 |
| 27.50 | N/A | N/A | N/A | 55.1 | N/A | 0.000 | 0.00 | 0.19 |
| 28.50 | N/A | N/A | N/A | 60.4 | N/A | 0.000 | 0.00 | 0.19 |
| 29.50 | N/A | N/A | N/A | 68.2 | N/A | 0.000 | 0.00 | 0.19 |
| 30.50 | N/A | N/A | N/A | 63.8 | N/A | 0.000 | 0.00 | 0.19 |
| 31.50 | N/A | N/A | N/A | 47.8 | N/A | 0.000 | 0.00 | 0.19 |
| 32.50 | N/A | N/A | N/A | 50.8 | N/A | 0.000 | 0.00 | 0.19 |
| 33.50 | N/A | N/A | N/A | 32.0 | N/A | 0.493 | 0.06 | 0.13 |
| 34.50 | N/A | N/A | N/A | 38.3 | N/A | 0.033 | 0.00 | 0.12 |
| 35.50 | 2.8 | 21.6 | 1,200 | 27.5 | N/A | 1.013 | 0.12 | 0.00 |
| 36.50 | N/A | N/A | N/A | 39.0 | N/A | 0.018 | 0.00 | 0.00 |
| 37.50 | N/A | N/A | N/A | 74.3 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | N/A | N/A | N/A | 76.8 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | N/A | N/A | N/A | 81.5 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | N/A | N/A | N/A | 76.5 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | N/A | N/A | N/A | 73.2 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | N/A | N/A | N/A | 109.0 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 518 |
| avg= | 1,131 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-04 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 4.50 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ $(\sigma_v/\sigma_v')$ $r_d$

+++ FS = $(CRR_{7.5}/CSR)$ MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 9.50 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 9.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.76 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.01 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.77 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 0.50 | 103.77 | 0.53 | 0.51 | sand |
| 1.50 | 85.25 | 0.97 | 1.14 | sand to silty sand |
| 2.50 | 69.77 | 0.95 | 1.36 | silty sand to sandy silt |
| 3.50 | 75.55 | 0.94 | 1.24 | sand to silty sand |
| 4.50 | 38.77 | 0.52 | 1.34 | silty sand to sandy silt |
| 5.50 | 15.07 | 0.44 | 2.89 | clayey silt to silty clay |
| 6.50 | 26.22 | 0.70 | 2.65 | sandy silt to clayey silt |
| 7.50 | 18.08 | 0.49 | 2.69 | clayey silt to silty clay |
| 8.50 | 14.42 | 0.47 | 3.28 | silty clay to clay |
| 9.50 | 16.20 | 0.49 | 2.99 | clayey silt to silty clay |
| 10.50 | 19.07 | 0.47 | 2.46 | clayey silt to silty clay |
| 11.50 | 65.75 | 1.03 | 1.57 | silty sand to sandy silt |
| 12.50 | 89.70 | 0.98 | 1.09 | sand to silty sand |
| 13.50 | 18.75 | 0.47 | 2.48 | clayey silt to silty clay |
| 14.50 | 8.22 | 0.19 | 2.26 | silty clay to clay |
| 15.50 | 8.70 | 0.21 | 2.39 | silty clay to clay |
| 16.50 | 38.43 | 0.24 | 0.62 | silty sand to sandy silt |
| 17.50 | 103.13 | 0.48 | 0.47 | sand |
| 18.50 | 93.72 | 0.76 | 0.81 | sand to silty sand |
| 19.50 | 36.90 | 0.55 | 1.49 | silty sand to sandy silt |
| 20.50 | 11.44 | 0.15 | 1.34 | clayey silt to silty clay |
| 21.50 | 16.25 | 0.24 | 1.49 | sandy silt to clayey silt |
| 22.50 | 27.62 | 0.66 | 2.39 | sandy silt to clayey silt |
| 23.50 | 33.55 | 1.55 | 4.59 | silty clay to clay |
| 24.50 | 19.15 | 0.82 | 4.28 | clay |
| 25.50 | 15.55 | 0.52 | 3.34 | silty clay to clay |
| 26.50 | 43.78 | 0.91 | 2.08 | sandy silt to clayey silt |
| 27.50 | 22.85 | 0.66 | 2.85 | clayey silt to silty clay |
| 28.50 | 21.82 | 0.74 | 3.38 | clayey silt to silty clay |
| 29.50 | 34.53 | 1.20 | 3.47 | clayey silt to silty clay |
| 30.50 | 73.55 | 1.57 | 2.13 | silty sand to sandy silt |
| 31.50 | 232.09 | 0.90 | 0.39 | sand |
| 32.50 | 206.53 | 0.73 | 0.35 | sand |
| 33.50 | 202.22 | 1.57 | 0.77 | sand |
| 34.50 | 390.65 | 1.86 | 0.48 | gravelly sand to sand |
| 35.50 | 554.55 | 4.29 | 0.77 | gravelly sand to sand |
| 36.50 | 532.48 | 1.72 | 0.32 | gravelly sand to sand |
| 37.50 | 488.42 | 1.36 | 0.28 | gravelly sand to sand |
| 38.50 | 405.65 | 0.83 | 0.21 | gravelly sand to sand |
| 39.50 | 468.97 | 1.09 | 0.23 | gravelly sand to sand |
| 40.50 | 516.57 | 2.06 | 0.40 | gravelly sand to sand |
| 41.50 | 526.49 | 1.66 | 0.32 | gravelly sand to sand |
| 42.50 | 578.73 | 1.98 | 0.34 | gravelly sand to sand |
| 43.50 | 596.97 | 2.56 | 0.43 | gravelly sand to sand |
| 44.50 | 685.75 | 2.03 | 0.30 | gravelly sand to sand |
| 45.50 | 545.87 | 1.72 | 0.32 | gravelly sand to sand |
| 46.50 | 506.40 | 1.62 | 0.32 | gravelly sand to sand |
| 47.50 | 664.88 | 2.00 | 0.30 | gravelly sand to sand |
| 48.50 | 587.92 | 2.39 | 0.41 | gravelly sand to sand |
| 49.50 | 709.97 | 1.65 | 0.23 | gravelly sand to sand |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |
| | | | | #N/A |

**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.50 | 13.0 | 1.00 | 21 | 60 | 60 | 60 | 1.16 | 1.00 | 599.10 | 0.999 | N/A | 0.403 | N/A | N/A | NO |
| 1.50 | 12.0 | 1.00 | 21 | 180 | 180 | 180 | 1.63 | 1.00 | 284.17 | 0.997 | N/A | 0.402 | N/A | N/A | NO |
| 2.50 | 11.0 | 1.00 | 23 | 300 | 300 | 300 | 1.82 | 1.12 | 202.06 | 0.994 | N/A | 0.401 | N/A | N/A | NO |
| 3.50 | 10.0 | 1.00 | 19 | 420 | 420 | 420 | 1.82 | 1.12 | 184.33 | 0.992 | N/A | 0.400 | N/A | N/A | NO |
| 4.50 | 9.0 | 1.66 | 21 | 540 | 540 | 540 | 1.78 | 1.09 | 135.06 | 0.990 | N/A | 0.399 | N/A | N/A | NO |
| 5.50 | 8.0 | 1.00 | 8 | 660 | 660 | 660 | 2.57 | 3.13 | 108.15 | 0.987 | N/A | 0.398 | N/A | N/A | NO |
| 6.50 | 7.0 | 1.00 | 10 | 780 | 780 | 780 | 2.48 | 2.65 | 111.37 | 0.985 | N/A | 0.397 | N/A | N/A | NO |
| 7.50 | 6.0 | 1.00 | 9 | 900 | 900 | 900 | 2.56 | 3.11 | 102.41 | 0.983 | N/A | 0.396 | N/A | N/A | NO |
| 8.50 | 5.0 | 1.00 | 10 | 1,020 | 1,020 | 1,020 | 2.73 | N/A | N/A | 0.980 | N/A | 0.395 | N/A | N/A | NO |
| 9.50 | 4.0 | 1.00 | 8 | 1,140 | 1,109 | 1,140 | 2.68 | N/A | N/A | 0.978 | N/A | 0.405 | N/A | N/A | NO |
| 10.50 | 3.0 | 1.00 | 10 | 1,260 | 1,166 | 1,198 | 2.59 | 3.26 | 93.10 | 0.976 | 1.000 | 0.425 | 0.155 | 0.469 | YES |
| 11.50 | 2.0 | 1.00 | 22 | 1,380 | 1,224 | 1,255 | 2.10 | 1.45 | 122.16 | 0.973 | 1.000 | 0.442 | 0.250 | 0.725 | YES |
| 12.50 | 1.0 | 1.66 | 37 | 1,500 | 1,282 | 1,313 | 1.59 | 1.00 | 185.53 | 0.971 | 1.000 | 0.458 | N/A | N/A | NO |
| 13.50 | 0.0 | 1.66 | 16 | 1,620 | 1,339 | 1,370 | 2.36 | 2.15 | 81.53 | 0.969 | 1.000 | 0.472 | 0.130 | 0.355 | YES |
| 14.50 | -1.0 | 1.00 | 5 | 1,740 | 1,397 | 1,428 | 2.93 | N/A | N/A | 0.966 | N/A | 0.485 | N/A | N/A | NO |
| 15.50 | -2.0 | 1.00 | 6 | 1,860 | 1,454 | 1,486 | 2.93 | N/A | N/A | 0.964 | N/A | 0.497 | N/A | N/A | NO |
| 16.50 | -3.0 | 1.00 | 13 | 1,980 | 1,512 | 1,543 | 2.09 | 1.44 | 63.66 | 0.962 | 1.000 | 0.507 | 0.104 | 0.263 | YES |
| 17.50 | -4.0 | 1.00 | 21 | 2,100 | 1,570 | 1,601 | 1.66 | 1.00 | 116.42 | 0.959 | 1.000 | 0.517 | 0.227 | 0.563 | YES |
| 18.50 | -5.0 | 1.66 | 39 | 2,220 | 1,627 | 1,658 | 1.54 | 1.00 | 172.03 | 0.957 | 1.000 | 0.526 | N/A | N/A | NO |
| 19.50 | -6.0 | 1.66 | 20 | 2,340 | 1,685 | 1,716 | 2.03 | 1.34 | 89.13 | 0.955 | 1.000 | 0.534 | 0.146 | 0.351 | YES |
| 20.50 | -7.0 | 1.00 | 6 | 2,460 | 1,742 | 1,774 | 2.75 | N/A | N/A | 0.952 | N/A | 0.542 | N/A | N/A | NO |
| 21.50 | -8.0 | 1.00 | 7 | 2,580 | 1,800 | 1,831 | 2.65 | N/A | N/A | 0.950 | N/A | 0.549 | N/A | N/A | NO |
| 22.50 | -9.0 | 1.00 | 11 | 2,700 | 1,858 | 1,889 | 2.58 | 3.23 | 92.67 | 0.948 | 1.000 | 0.555 | 0.154 | 0.356 | YES |
| 23.50 | -10.0 | 1.00 | 22 | 2,820 | 1,915 | 1,946 | 2.71 | N/A | N/A | 0.945 | N/A | 0.561 | N/A | N/A | NO |
| 24.50 | -11.0 | 1.00 | 19 | 2,940 | 1,973 | 2,004 | 2.89 | N/A | N/A | 0.943 | N/A | 0.566 | N/A | N/A | NO |
| 25.50 | -12.0 | 1.00 | 10 | 3,060 | 2,030 | 2,062 | 2.90 | N/A | N/A | 0.941 | N/A | 0.571 | N/A | N/A | NO |
| 26.50 | -13.0 | 1.00 | 18 | 3,180 | 2,088 | 2,119 | 2.41 | 2.34 | 100.45 | 0.938 | 0.987 | 0.576 | 0.174 | 0.384 | YES |
| 27.50 | -14.0 | 1.00 | 11 | 3,300 | 2,146 | 2,177 | 2.73 | N/A | N/A | 0.936 | N/A | 0.580 | N/A | N/A | NO |
| 28.50 | -15.0 | 1.00 | 11 | 3,420 | 2,203 | 2,234 | 2.80 | N/A | N/A | 0.934 | N/A | 0.584 | N/A | N/A | NO |
| 29.50 | -16.0 | 1.00 | 17 | 3,540 | 2,261 | 2,292 | 2.66 | N/A | N/A | 0.931 | N/A | 0.588 | N/A | N/A | NO |
| 30.50 | -17.0 | 1.00 | 25 | 3,660 | 2,318 | 2,350 | 2.26 | 1.83 | 124.94 | 0.926 | 0.949 | 0.589 | 0.261 | 0.541 | YES |
| 31.50 | -18.0 | 1.00 | 46 | 3,780 | 2,376 | 2,407 | 1.40 | 1.00 | 212.93 | 0.918 | 0.933 | 0.588 | N/A | N/A | NO |
| 32.50 | -19.0 | 1.00 | 41 | 3,900 | 2,434 | 2,465 | 1.42 | 1.00 | 187.23 | 0.909 | 0.925 | 0.587 | N/A | N/A | NO |
| 33.50 | -20.0 | 1.00 | 40 | 4,020 | 2,491 | 2,522 | 1.65 | 1.00 | 181.25 | 0.901 | 0.916 | 0.586 | N/A | N/A | NO |
| 34.50 | -21.0 | 1.00 | 65 | 4,140 | 2,549 | 2,580 | 1.29 | 1.00 | 346.05 | 0.893 | 0.908 | 0.585 | N/A | N/A | NO |
| 35.50 | -22.0 | 1.00 | 92 | 4,260 | 2,606 | 2,638 | 1.36 | 1.00 | 485.78 | 0.885 | 0.899 | 0.583 | N/A | N/A | NO |
| 36.50 | -23.0 | 1.00 | 89 | 4,380 | 2,664 | 2,695 | 1.09 | 1.00 | 461.37 | 0.877 | 0.892 | 0.581 | N/A | N/A | NO |
| 37.50 | -24.0 | 1.00 | 81 | 4,500 | 2,722 | 2,753 | 1.08 | 1.00 | 418.69 | 0.869 | 0.884 | 0.579 | N/A | N/A | NO |
| 38.50 | -25.0 | 1.00 | 68 | 4,620 | 2,779 | 2,810 | 1.08 | 1.00 | 344.12 | 0.861 | 0.877 | 0.577 | N/A | N/A | NO |
| 39.50 | -26.0 | 1.00 | 78 | 4,740 | 2,837 | 2,868 | 1.05 | 1.00 | 393.77 | 0.852 | 0.870 | 0.574 | N/A | N/A | NO |
| 40.50 | -27.0 | 1.00 | 86 | 4,860 | 2,894 | 2,926 | 1.17 | 1.00 | 429.40 | 0.844 | 0.863 | 0.571 | N/A | N/A | NO |
| 41.50 | -28.0 | 1.00 | 88 | 4,980 | 2,952 | 2,983 | 1.10 | 1.00 | 433.36 | 0.836 | 0.856 | 0.568 | N/A | N/A | NO |
| 42.50 | -29.0 | 1.00 | 96 | 5,100 | 3,010 | 3,041 | 1.10 | 1.00 | 471.78 | 0.828 | 0.849 | 0.565 | N/A | N/A | NO |
| 43.50 | -30.0 | 1.00 | 99 | 5,220 | 3,067 | 3,098 | 1.16 | 1.00 | 482.06 | 0.820 | 0.843 | 0.562 | N/A | N/A | NO |
| 44.50 | -31.0 | 1.00 | 114 | 5,340 | 3,125 | 3,156 | 1.01 | 1.00 | 548.62 | 0.812 | 0.837 | 0.559 | N/A | N/A | NO |
| 45.50 | -32.0 | 1.00 | 91 | 5,460 | 3,182 | 3,214 | 1.10 | 1.00 | 432.74 | 0.804 | 0.830 | 0.556 | N/A | N/A | NO |
| 46.50 | -33.0 | 1.00 | 84 | 5,580 | 3,240 | 3,271 | 1.13 | 1.00 | 397.87 | 0.795 | 0.825 | 0.552 | N/A | N/A | NO |
| 47.50 | -34.0 | 1.00 | 111 | 5,700 | 3,298 | 3,329 | 1.03 | 1.00 | 517.80 | 0.787 | 0.819 | 0.548 | N/A | N/A | NO |
| 48.50 | -35.0 | 1.00 | 98 | 5,820 | 3,355 | 3,386 | 1.16 | 1.00 | 453.92 | 0.779 | 0.813 | 0.545 | N/A | N/A | NO |
| 49.50 | -36.0 | 1.00 | 118 | 5,940 | 3,413 | 3,444 | 0.94 | 1.00 | 543.50 | 0.771 | 0.808 | 0.541 | N/A | N/A | NO |

**RESIDUAL STRENGTH *** / **GROUND SETTLEMENT ****

| Soil Depth During Test (ft) | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 0.50 | N/A | N/A | N/A | 35.3 | 0.038 | 0.033 | 0.00 | 0.77 |
| 1.50 | N/A | N/A | N/A | 40.5 | 0.063 | 0.000 | 0.00 | 0.77 |
| 2.50 | N/A | N/A | N/A | 52.4 | 0.074 | 0.000 | 0.00 | 0.77 |
| 3.50 | N/A | N/A | N/A | 36.2 | 0.099 | 0.083 | 0.01 | 0.76 |
| 4.50 | N/A | N/A | N/A | 48.6 | 0.101 | 0.000 | 0.00 | 0.76 |
| 5.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 6.50 | N/A | N/A | N/A | 25.2 | N/A | N/A | N/A | 0.76 |
| 7.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 8.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 9.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 10.50 | 2.8 | 15.1 | 691 | N/A | N/A | 0.000 | 0.00 | 0.76 |
| 11.50 | 2.8 | 30.5 | 1,200 | 38.2 | N/A | 0.020 | 0.00 | 0.76 |
| 12.50 | N/A | N/A | N/A | 50.5 | N/A | 0.000 | 0.00 | 0.76 |
| 13.50 | 2.8 | 21.6 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.76 |
| 14.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 15.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.76 |
| 16.50 | 2.8 | 17.4 | 912 | 22.5 | N/A | 1.343 | 0.16 | 0.60 |
| 17.50 | 0.0 | 23.1 | 1,200 | 23.1 | N/A | 1.306 | 0.16 | 0.44 |
| 18.50 | N/A | N/A | N/A | 47.1 | N/A | 0.000 | 0.00 | 0.44 |
| 19.50 | 2.8 | 24.8 | 1,200 | 31.4 | N/A | 0.345 | 0.04 | 0.40 |
| 20.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.40 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.40 |
| 22.50 | 2.8 | 14.2 | 606 | 18.6 | N/A | 1.650 | 0.20 | 0.20 |
| 23.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 24.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 25.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.20 |
| 26.50 | 2.8 | 19.8 | 1,166 | 25.4 | N/A | 1.160 | 0.14 | 0.06 |
| 27.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 |
| 28.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 |
| 29.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.06 |
| 30.50 | 2.8 | 25.4 | 1,200 | 32.1 | N/A | 0.360 | 0.04 | 0.02 |
| 31.50 | N/A | N/A | N/A | 42.3 | N/A | 0.000 | 0.00 | 0.02 |
| 32.50 | N/A | N/A | N/A | 37.2 | N/A | 0.047 | 0.01 | 0.01 |
| 33.50 | N/A | N/A | N/A | 36.0 | N/A | 0.066 | 0.01 | 0.00 |
| 34.50 | N/A | N/A | N/A | 57.3 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | N/A | N/A | N/A | 80.5 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | N/A | N/A | N/A | 76.4 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | N/A | N/A | N/A | 69.4 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | N/A | N/A | N/A | 57.0 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | N/A | N/A | N/A | 65.3 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | N/A | N/A | N/A | 71.2 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | N/A | N/A | N/A | 71.8 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | N/A | N/A | N/A | 78.2 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | N/A | N/A | N/A | 79.9 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | N/A | N/A | N/A | 91.0 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | N/A | N/A | N/A | 71.8 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | N/A | N/A | N/A | 66.0 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | N/A | N/A | N/A | 85.9 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | N/A | N/A | N/A | 75.3 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | N/A | N/A | N/A | 90.2 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 606 |
| avg= | 1,042 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-05 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 3.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ $CSR = 0.65\ A_{max}\ (\sigma_v/\sigma_v')\ r_d$

+++ $FS = (CRR_{7.5}/CSR)\ MSF\ K_\sigma\ K_{\alpha \longrightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | | |
|---|---|---|
| GWT Depth During Test, Zw = | 11.00 | ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 | ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 12.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 1.40 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.01 inches | <--- Dry or Unsaturated Sands |
| Total: | 1.41 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 33.58 | 0.15 | 0.45 | silty sand to sandy silt | 13.0 | 1.00 | 11 | 60 | 60 | 60 | 1.47 | 1.00 | 193.89 | 0.999 | N/A | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | 27.8 | 0.042 | 0.048 | 0.01 | 1.41 |
| 1.50 | 74.03 | 0.83 | 1.12 | sand to silty sand | 12.0 | 1.00 | 19 | 180 | 180 | 180 | 1.67 | 1.01 | 250.34 | 0.997 | N/A | 0.402 | N/A | N/A | NO | N/A | N/A | N/A | 35.5 | 0.066 | 0.057 | 0.01 | 1.40 |
| 2.50 | 88.45 | 1.39 | 1.57 | silty sand to sandy silt | 11.0 | 1.00 | 29 | 300 | 300 | 300 | 1.80 | 1.11 | 252.96 | 0.994 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 65.1 | 0.069 | 0.000 | 0.00 | 1.40 |
| 3.50 | 91.72 | 1.12 | 1.22 | sand to silty sand | 10.0 | 1.00 | 23 | 420 | 420 | 420 | 1.75 | 1.07 | 215.08 | 0.992 | N/A | 0.400 | N/A | N/A | NO | N/A | N/A | N/A | 43.4 | 0.093 | 0.000 | 0.00 | 1.40 |
| 4.50 | 56.58 | 0.71 | 1.25 | silty sand to sandy silt | 9.0 | 1.00 | 19 | 540 | 540 | 540 | 1.95 | 1.24 | 134.61 | 0.990 | N/A | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 43.5 | 0.104 | 0.000 | 0.00 | 1.40 |
| 5.50 | 44.13 | 0.44 | 0.99 | silty sand to sandy silt | 8.0 | 1.66 | 24 | 660 | 660 | 660 | 1.69 | 1.03 | 131.21 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 54.7 | 0.106 | 0.000 | 0.00 | 1.40 |
| 6.50 | 12.35 | 0.23 | 1.89 | clayey silt to silty clay | 7.0 | 1.00 | 6 | 780 | 780 | 780 | 2.56 | 3.11 | 77.81 | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.40 |
| 7.50 | 24.78 | 0.67 | 2.71 | clayey silt to silty clay | 6.0 | 1.00 | 12 | 900 | 900 | 900 | 2.52 | 2.90 | 107.02 | 0.983 | N/A | 0.396 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.40 |
| 8.50 | 23.97 | 0.69 | 2.87 | clayey silt to silty clay | 5.0 | 1.00 | 12 | 1,020 | 1,020 | 1,020 | 2.57 | 3.17 | 106.40 | 0.980 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.40 |
| 9.50 | 20.92 | 0.66 | 3.14 | clayey silt to silty clay | 4.0 | 1.00 | 10 | 1,140 | 1,109 | 1,140 | 2.61 | N/A | N/A | 0.978 | N/A | 0.405 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.40 |
| 10.50 | 18.59 | 0.47 | 2.51 | clayey silt to silty clay | 3.0 | 1.00 | 9 | 1,260 | 1,166 | 1,260 | 2.60 | N/A | N/A | 0.976 | N/A | 0.425 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.40 |
| 11.50 | 20.98 | 0.46 | 2.20 | sandy silt to clayey silt | 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,349 | 2.58 | 3.21 | 85.98 | 0.973 | 1.000 | 0.442 | 0.139 | 0.404 | YES | 2.8 | 13.0 | 512 | 17.3 | N/A | 1.723 | 0.21 | 1.20 |
| 12.50 | 35.20 | 0.88 | 2.49 | sandy silt to clayey silt | 1.0 | 1.00 | 14 | 1,500 | 1,282 | 1,406 | 2.44 | 2.50 | 110.15 | 0.971 | 1.000 | 0.458 | 0.204 | 0.573 | YES | 2.8 | 19.6 | 1,143 | 25.1 | N/A | 1.102 | 0.13 | 1.07 |
| 13.50 | 51.87 | 0.97 | 1.86 | silty sand to sandy silt | 0.0 | 1.66 | 29 | 1,620 | 1,339 | 1,464 | 1.93 | 1.22 | 127.87 | 0.969 | 1.000 | 0.472 | 0.274 | 0.747 | YES | 2.8 | 36.3 | 1,200 | 45.2 | N/A | 0.000 | 0.00 | 1.07 |
| 14.50 | 11.78 | 0.30 | 2.54 | clayey silt to silty clay | -1.0 | 1.00 | 6 | 1,740 | 1,397 | 1,522 | 2.82 | N/A | N/A | 0.966 | N/A | 0.485 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.07 |
| 15.50 | 9.55 | 0.18 | 1.84 | clayey silt to silty clay | -2.0 | 1.00 | 5 | 1,860 | 1,454 | 1,579 | 2.84 | N/A | N/A | 0.964 | N/A | 0.497 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.07 |
| 16.50 | 12.17 | 0.38 | 3.12 | silty clay to clay | -3.0 | 1.00 | 8 | 1,980 | 1,512 | 1,637 | 2.89 | N/A | N/A | 0.962 | N/A | 0.507 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.07 |
| 17.50 | 31.68 | 0.51 | 1.61 | sandy silt to clayey silt | -4.0 | 1.00 | 13 | 2,100 | 1,570 | 1,694 | 2.40 | 2.31 | 82.57 | 0.959 | 1.000 | 0.517 | 0.132 | 0.329 | YES | 2.8 | 16.6 | 830 | 21.5 | N/A | 1.422 | 0.17 | 0.90 |
| 18.50 | 56.67 | 0.73 | 1.28 | silty sand to sandy silt | -5.0 | 1.00 | 19 | 2,220 | 1,627 | 1,752 | 2.14 | 1.53 | 96.23 | 0.957 | 1.000 | 0.526 | 0.163 | 0.398 | YES | 2.8 | 23.0 | 1,200 | 29.2 | N/A | 0.693 | 0.08 | 0.81 |
| 19.50 | 75.93 | 0.61 | 0.80 | sand to silty sand | -6.0 | 1.00 | 19 | 2,340 | 1,685 | 1,810 | 1.92 | 1.21 | 99.94 | 0.955 | 1.000 | 0.534 | 0.173 | 0.416 | YES | 1.3 | 21.3 | 1,200 | 23.4 | N/A | 1.291 | 0.15 | 0.66 |
| 20.50 | 38.90 | 0.66 | 1.71 | silty sand to sandy silt | -7.0 | 1.66 | 21 | 2,460 | 1,742 | 1,867 | 2.05 | 1.37 | 94.60 | 0.952 | 1.000 | 0.542 | 0.159 | 0.376 | YES | 2.8 | 25.0 | 1,200 | 31.7 | N/A | 0.317 | 0.04 | 0.62 |
| 21.50 | 13.35 | 0.34 | 2.53 | clayey silt to silty clay | -8.0 | 1.00 | 7 | 2,580 | 1,800 | 1,925 | 2.85 | N/A | N/A | 0.950 | N/A | 0.549 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 22.50 | 21.45 | 0.80 | 3.75 | silty clay to clay | -9.0 | 1.00 | 14 | 2,700 | 1,858 | 1,982 | 2.79 | N/A | N/A | 0.948 | N/A | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 23.50 | 25.98 | 0.89 | 3.41 | clayey silt to silty clay | -10.0 | 1.00 | 13 | 2,820 | 1,915 | 2,040 | 2.71 | N/A | N/A | 0.945 | N/A | 0.561 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.62 |
| 24.50 | 27.83 | 0.61 | 2.18 | sandy silt to clayey silt | -11.0 | 1.00 | 11 | 2,940 | 1,973 | 2,098 | 2.57 | 3.13 | 87.98 | 0.943 | 1.000 | 0.566 | 0.143 | 0.325 | YES | 2.8 | 13.7 | 564 | 18.0 | N/A | 1.695 | 0.20 | 0.42 |
| 25.50 | 25.98 | 0.73 | 2.80 | clayey silt to silty clay | -12.0 | 1.00 | 13 | 3,060 | 2,030 | 2,155 | 2.67 | N/A | N/A | 0.941 | N/A | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.42 |
| 26.50 | 20.57 | 0.69 | 3.34 | clayey silt to silty clay | -13.0 | 1.00 | 10 | 3,180 | 2,088 | 2,213 | 2.81 | N/A | N/A | 0.938 | N/A | 0.576 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.42 |
| 27.50 | 46.97 | 1.18 | 2.52 | sandy silt to clayey silt | -14.0 | 1.00 | 19 | 3,300 | 2,146 | 2,270 | 2.44 | 2.50 | 113.18 | 0.936 | 0.978 | 0.580 | 0.215 | 0.465 | YES | 2.8 | 20.4 | 1,200 | 26.2 | N/A | 1.107 | 0.13 | 0.28 |
| 28.50 | 84.93 | 1.57 | 1.85 | silty sand to sandy silt | -15.0 | 1.00 | 28 | 3,420 | 2,203 | 2,328 | 2.16 | 1.58 | 127.95 | 0.934 | 0.964 | 0.584 | 0.275 | 0.582 | YES | 2.8 | 29.0 | 1,200 | 36.5 | N/A | 0.058 | 0.01 | 0.28 |
| 29.50 | 139.82 | 1.20 | 0.85 | sand | -16.0 | 1.00 | 28 | 3,540 | 2,261 | 2,386 | 1.78 | 1.09 | 143.56 | 0.931 | 0.955 | 0.588 | 0.355 | 0.741 | YES | 0.0 | 25.6 | 1,200 | 25.6 | N/A | 1.149 | 0.14 | 0.14 |
| 30.50 | 145.62 | 1.52 | 1.05 | sand | -17.0 | 1.00 | 29 | 3,660 | 2,318 | 2,443 | 1.83 | 1.13 | 152.52 | 0.926 | 0.945 | 0.589 | 0.410 | 0.845 | YES | 0.0 | 26.3 | 1,200 | 26.3 | N/A | 1.095 | 0.13 | 0.01 |
| 31.50 | 221.80 | 1.91 | 0.86 | sand | -18.0 | 1.00 | 44 | 3,780 | 2,376 | 2,501 | 1.64 | 1.00 | 202.78 | 0.918 | 0.933 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 39.7 | N/A | 0.006 | 0.00 | 0.01 |
| 32.50 | 380.27 | 0.94 | 0.25 | gravelly sand to sand | -19.0 | 1.00 | 63 | 3,900 | 2,434 | 2,558 | 1.12 | 1.00 | 344.73 | 0.909 | 0.925 | 0.587 | N/A | N/A | NO | N/A | N/A | N/A | 56.0 | N/A | 0.000 | 0.00 | 0.01 |
| 33.50 | 474.85 | 2.20 | 0.46 | gravelly sand to sand | -20.0 | 1.00 | 79 | 4,020 | 2,491 | 2,616 | 1.22 | 1.00 | 425.47 | 0.901 | 0.916 | 0.586 | N/A | N/A | NO | N/A | N/A | N/A | 69.2 | N/A | 0.000 | 0.00 | 0.01 |
| 34.50 | 652.08 | 5.73 | 0.88 | gravelly sand to sand | -21.0 | 1.00 | 109 | 4,140 | 2,549 | 2,674 | 1.36 | 1.00 | 577.63 | 0.893 | 0.908 | 0.585 | N/A | N/A | NO | N/A | N/A | N/A | 94.0 | N/A | 0.000 | 0.00 | 0.01 |
| 35.50 | 520.00 | 2.92 | 0.56 | gravelly sand to sand | -22.0 | 1.66 | 143 | 4,260 | 2,606 | 2,731 | 0.96 | 1.00 | 754.21 | 0.885 | 0.899 | 0.583 | N/A | N/A | NO | N/A | N/A | N/A | 122.8 | N/A | 0.000 | 0.00 | 0.01 |
| 36.50 | 247.58 | 1.47 | 0.59 | sand | -23.0 | 1.00 | 50 | 4,380 | 2,664 | 2,789 | 1.51 | 1.00 | 214.52 | 0.877 | 0.892 | 0.581 | N/A | N/A | NO | N/A | N/A | N/A | 41.9 | N/A | 0.000 | 0.00 | 0.01 |
| 37.50 | 362.73 | 1.50 | 0.41 | gravelly sand to sand | -24.0 | 1.00 | 60 | 4,500 | 2,722 | 2,846 | 1.29 | 1.00 | 310.95 | 0.869 | 0.884 | 0.579 | N/A | N/A | NO | N/A | N/A | N/A | 50.7 | N/A | 0.000 | 0.00 | 0.01 |
| 38.50 | 393.37 | 1.13 | 0.29 | gravelly sand to sand | -25.0 | 1.00 | 66 | 4,620 | 2,779 | 2,904 | 1.17 | 1.00 | 333.70 | 0.861 | 0.877 | 0.577 | N/A | N/A | NO | N/A | N/A | N/A | 54.4 | N/A | 0.000 | 0.00 | 0.01 |
| 39.50 | 431.93 | 1.10 | 0.26 | gravelly sand to sand | -26.0 | 1.00 | 72 | 4,740 | 2,837 | 2,962 | 1.11 | 1.00 | 362.67 | 0.852 | 0.870 | 0.574 | N/A | N/A | NO | N/A | N/A | N/A | 59.2 | N/A | 0.000 | 0.00 | 0.01 |
| 40.50 | 450.02 | 1.24 | 0.28 | gravelly sand to sand | -27.0 | 1.00 | 75 | 4,860 | 2,894 | 3,019 | 1.12 | 1.00 | 374.08 | 0.844 | 0.863 | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | 61.0 | N/A | 0.000 | 0.00 | 0.01 |
| 41.50 | 478.06 | 1.65 | 0.35 | gravelly sand to sand | -28.0 | 1.00 | 80 | 4,980 | 2,952 | 3,077 | 1.16 | 1.00 | 393.50 | 0.836 | 0.856 | 0.568 | N/A | N/A | NO | N/A | N/A | N/A | 64.2 | N/A | 0.000 | 0.00 | 0.01 |
| 42.50 | 555.95 | 1.96 | 0.35 | gravelly sand to sand | -29.0 | 1.00 | 93 | 5,100 | 3,010 | 3,134 | 1.12 | 1.00 | 453.21 | 0.828 | 0.849 | 0.565 | N/A | N/A | NO | N/A | N/A | N/A | 74.0 | N/A | 0.000 | 0.00 | 0.01 |
| 43.50 | 637.50 | 3.09 | 0.49 | gravelly sand to sand | -30.0 | 1.00 | 106 | 5,220 | 3,067 | 3,192 | 1.18 | 1.00 | 514.79 | 0.820 | 0.843 | 0.562 | N/A | N/A | NO | N/A | N/A | N/A | 84.1 | N/A | 0.000 | 0.00 | 0.01 |
| 44.50 | 586.12 | 2.58 | 0.44 | gravelly sand to sand | -31.0 | 1.00 | 98 | 5,340 | 3,125 | 3,250 | 1.18 | 1.00 | 468.91 | 0.812 | 0.837 | 0.559 | N/A | N/A | NO | N/A | N/A | N/A | 76.6 | N/A | 0.000 | 0.00 | 0.01 |
| 45.50 | 645.50 | 2.16 | 0.33 | gravelly sand to sand | -32.0 | 1.00 | 108 | 5,460 | 3,182 | 3,307 | 1.07 | 1.00 | 511.73 | 0.804 | 0.830 | 0.556 | N/A | N/A | NO | N/A | N/A | N/A | 83.7 | N/A | 0.000 | 0.00 | 0.01 |
| 46.50 | 500.82 | 1.61 | 0.32 | gravelly sand to sand | -33.0 | 1.00 | 83 | 5,580 | 3,240 | 3,365 | 1.14 | 1.00 | 393.48 | 0.795 | 0.825 | 0.552 | N/A | N/A | NO | N/A | N/A | N/A | 64.4 | N/A | 0.000 | 0.00 | 0.01 |
| 47.50 | 520.17 | 1.47 | 0.28 | gravelly sand to sand | -34.0 | 1.00 | 87 | 5,700 | 3,298 | 3,422 | 1.09 | 1.00 | 405.10 | 0.787 | 0.819 | 0.548 | N/A | N/A | NO | N/A | N/A | N/A | 66.3 | N/A | 0.000 | 0.00 | 0.01 |
| 48.50 | 545.60 | 2.22 | 0.41 | gravelly sand to sand | -35.0 | 1.00 | 91 | 5,820 | 3,355 | 3,480 | 1.19 | 1.00 | 421.24 | 0.779 | 0.813 | 0.545 | N/A | N/A | NO | N/A | N/A | N/A | 68.9 | N/A | 0.000 | 0.00 | 0.01 |
| 49.50 | 569.57 | 1.44 | 0.25 | gravelly sand to sand | -36.0 | 1.00 | 95 | 5,940 | 3,413 | 3,538 | 1.04 | 1.00 | 436.02 | 0.771 | 0.808 | 0.541 | N/A | N/A | NO | N/A | N/A | N/A | 71.4 | N/A | 0.000 | 0.00 | 0.01 |
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|---|---|
| max= | 1,200 |
| min= | 512 |
| avg= | 1,054 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-06 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | -6.30 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ $CSR = 0.65\ A_{max}\ (\sigma_v/\sigma_v')\ r_d$

+++ $FS = (CRR_{7.5}/CSR)\ MSF\ K_\sigma\ K_\alpha$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 20.30 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 4.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.53 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.53 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 9.45 | 0.13 | 1.36 | clayey silt to silty clay |
| 6.50 | 11.00 | 0.42 | 3.82 | clay |
| 7.50 | 27.13 | 0.77 | 2.82 | clayey silt to silty clay |
| 8.50 | 23.83 | 0.57 | 2.38 | sandy silt to clayey silt |
| 9.50 | 51.47 | 0.76 | 1.48 | silty sand to sandy silt |
| 10.50 | 44.56 | 0.69 | 1.55 | silty sand to sandy silt |
| 11.50 | 15.75 | 0.42 | 2.64 | clayey silt to silty clay |
| 12.50 | 17.02 | 0.46 | 2.67 | clayey silt to silty clay |
| 13.50 | 21.45 | 0.43 | 2.02 | sandy silt to clayey silt |
| 14.50 | 17.37 | 0.34 | 1.93 | clayey silt to silty clay |
| 15.50 | 8.75 | 0.24 | 2.79 | silty clay to clay |
| 16.50 | 8.83 | 0.21 | 2.34 | silty clay to clay |
| 17.50 | 16.38 | 0.51 | 3.09 | clayey silt to silty clay |
| 18.50 | 35.25 | 0.59 | 1.69 | sandy silt to clayey silt |
| 19.50 | 22.12 | 0.56 | 2.53 | clayey silt to silty clay |
| 20.50 | 13.40 | 0.33 | 2.44 | clayey silt to silty clay |
| 21.50 | 11.22 | 0.38 | 3.39 | silty clay to clay |
| 22.50 | 18.20 | 0.60 | 3.30 | clayey silt to silty clay |
| 23.50 | 33.10 | 1.10 | 3.33 | clayey silt to silty clay |
| 24.50 | 21.28 | 0.78 | 3.65 | silty clay to clay |
| 25.50 | 23.75 | 1.04 | 4.38 | silty clay to clay |
| 26.50 | 20.97 | 0.87 | 4.13 | silty clay to clay |
| 27.50 | 19.47 | 0.77 | 3.94 | silty clay to clay |
| 28.50 | 162.58 | 1.62 | 1.00 | sand |
| 29.50 | 559.58 | 3.22 | 0.58 | gravelly sand to sand |
| 30.50 | 708.05 | 5.51 | 0.78 | gravelly sand to sand |
| 31.50 | 686.50 | 2.89 | 0.42 | gravelly sand to sand |
| | | | | #N/A |
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| SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 8.0 | 1.00 | 5 | 660 | 660 | 660 | 2.53 | 2.95 | 63.94 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.53 |
| 7.0 | 1.00 | 11 | 780 | 780 | 780 | 2.79 | N/A | N/A | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.53 |
| 6.0 | 1.00 | 14 | 900 | 900 | 900 | 2.51 | 2.80 | 113.41 | 0.983 | N/A | 0.396 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.53 |
| 5.0 | 1.00 | 10 | 1,020 | 1,020 | 1,020 | 2.52 | 2.89 | 96.44 | 0.980 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | 21.0 | N/A | N/A | N/A | 0.53 |
| 4.0 | 1.00 | 17 | 1,140 | 1,109 | 1,140 | 2.15 | 1.54 | 106.79 | 0.978 | 1.000 | 0.405 | 0.193 | 0.613 | YES | 2.8 | 25.5 | 1,200 | 32.3 | N/A | 0.074 | 0.01 | 0.52 |
| 3.0 | 1.66 | 25 | 1,260 | 1,166 | 1,260 | 1.91 | 1.19 | 115.43 | 0.976 | 1.000 | 0.425 | 0.223 | 0.675 | YES | 2.8 | 33.8 | 1,200 | 42.2 | N/A | 0.000 | 0.00 | 0.52 |
| 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,380 | 2.69 | N/A | N/A | 0.973 | N/A | 0.442 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 1.0 | 1.00 | 9 | 1,500 | 1,282 | 1,500 | 2.68 | N/A | N/A | 0.971 | N/A | 0.458 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.52 |
| 0.0 | 1.00 | 9 | 1,620 | 1,339 | 1,620 | 2.57 | 3.13 | 81.95 | 0.969 | 1.000 | 0.472 | 0.131 | 0.357 | YES | 2.8 | 12.3 | 460 | 16.4 | N/A | 1.798 | 0.22 | 0.30 |
| -1.0 | 1.00 | 9 | 1,740 | 1,397 | 1,740 | 2.61 | N/A | N/A | 0.966 | N/A | 0.485 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.30 |
| -2.0 | 1.00 | 6 | 1,860 | 1,454 | 1,860 | 2.97 | N/A | N/A | 0.964 | N/A | 0.497 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.30 |
| -3.0 | 1.00 | 6 | 1,980 | 1,512 | 1,980 | 2.93 | N/A | N/A | 0.962 | N/A | 0.507 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.30 |
| -4.0 | 1.00 | 8 | 2,100 | 1,570 | 2,100 | 2.79 | N/A | N/A | 0.959 | N/A | 0.517 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.30 |
| -5.0 | 1.00 | 14 | 2,220 | 1,627 | 2,220 | 2.38 | 2.23 | 87.05 | 0.957 | 1.000 | 0.526 | 0.141 | 0.345 | YES | 2.8 | 16.2 | 792 | 21.1 | N/A | 1.461 | 0.18 | 0.13 |
| -6.0 | 1.00 | 11 | 2,340 | 1,685 | 2,340 | 2.64 | N/A | N/A | 0.955 | N/A | 0.534 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -7.0 | 1.00 | 7 | 2,460 | 1,742 | 2,448 | 2.83 | N/A | N/A | 0.952 | N/A | 0.542 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -8.0 | 1.00 | 7 | 2,580 | 1,800 | 2,505 | 2.99 | N/A | N/A | 0.950 | N/A | 0.549 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -9.0 | 1.00 | 9 | 2,700 | 1,858 | 2,563 | 2.81 | N/A | N/A | 0.948 | N/A | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -10.0 | 1.00 | 17 | 2,820 | 1,915 | 2,620 | 2.62 | N/A | N/A | 0.945 | N/A | 0.561 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -11.0 | 1.00 | 14 | 2,940 | 1,973 | 2,678 | 2.80 | N/A | N/A | 0.943 | N/A | 0.566 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -12.0 | 1.00 | 16 | 3,060 | 2,030 | 2,736 | 2.82 | N/A | N/A | 0.941 | N/A | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -13.0 | 1.00 | 14 | 3,180 | 2,088 | 2,793 | 2.86 | N/A | N/A | 0.938 | N/A | 0.576 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -14.0 | 1.00 | 13 | 3,300 | 2,146 | 2,851 | 2.88 | N/A | N/A | 0.936 | N/A | 0.580 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.13 |
| -15.0 | 1.00 | 33 | 3,420 | 2,203 | 2,908 | 1.77 | 1.09 | 168.10 | 0.934 | 0.963 | 0.584 | N/A | N/A | NO | N/A | N/A | N/A | 27.0 | N/A | 1.049 | 0.13 | 0.00 |
| -16.0 | 1.00 | 93 | 3,540 | 2,261 | 2,966 | 1.23 | 1.00 | 526.32 | 0.931 | 0.952 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 76.6 | N/A | 0.000 | 0.00 | 0.00 |
| -17.0 | 1.00 | 118 | 3,660 | 2,318 | 3,024 | 1.29 | 1.00 | 657.63 | 0.926 | 0.943 | 0.589 | N/A | N/A | NO | N/A | N/A | N/A | 96.0 | N/A | 0.000 | 0.00 | 0.00 |
| -18.0 | 1.00 | 114 | 3,780 | 2,376 | 3,081 | 1.08 | 1.00 | 629.84 | 0.918 | 0.933 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 92.2 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 460 |
| avg= | 913 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-07 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 2.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ $CSR = 0.65\ A_{max}\ (\sigma_v/\sigma_v')\ r_d$

+++ $FS = (CRR_{7.5}/CSR)\ MSF\ K_\sigma\ K_{\alpha\ -->>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 12.00 ft below ground surface

GWT Depth For Design, Zwd = 9.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 6.00 feet

Earthquake-Induced Settlements:

- Liquefaction-Induced Settlement = 0.67 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.00 inches <--- Dry or Unsaturated Sands

Total: 0.67 inches

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 5.50 | 17.67 | 0.30 | 1.68 | sandy silt to clayey silt | 8.0 | 1.66 | 12 | 660 | 660 | 660 | 2.15 | 1.55 | 79.14 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 28.9 | N/A | N/A | N/A | 0.67 |
| 6.50 | 6.67 | 0.14 | 2.08 | silty clay to clay | 7.0 | 1.00 | 4 | 780 | 780 | 780 | 2.81 | N/A | N/A | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.67 |
| 7.50 | 17.48 | 0.71 | 4.07 | silty clay to clay | 6.0 | 1.00 | 12 | 900 | 900 | 900 | 2.69 | N/A | N/A | 0.983 | N/A | 0.396 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.67 |
| 8.50 | 28.23 | 0.79 | 2.81 | clayey silt to silty clay | 5.0 | 1.00 | 14 | 1,020 | 1,020 | 1,020 | 2.51 | 2.84 | 112.15 | 0.980 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.67 |
| 9.50 | 23.02 | 0.54 | 2.33 | sandy silt to clayey silt | 4.0 | 1.00 | 9 | 1,140 | 1,109 | 1,140 | 2.54 | 3.00 | 92.73 | 0.978 | 1.000 | 0.405 | 0.154 | 0.489 | YES | 2.8 | 15.0 | 680 | 19.6 | N/A | 1.493 | 0.18 | 0.49 |
| 10.50 | 16.00 | 0.40 | 2.49 | clayey silt to silty clay | 3.0 | 1.00 | 8 | 1,260 | 1,166 | 1,260 | 2.65 | N/A | N/A | 0.976 | N/A | 0.425 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.49 |
| 11.50 | 11.00 | 0.34 | 3.08 | silty clay to clay | 2.0 | 1.00 | 7 | 1,380 | 1,224 | 1,380 | 2.86 | N/A | N/A | 0.973 | N/A | 0.442 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.49 |
| 12.50 | 11.00 | 0.22 | 2.03 | clayey silt to silty clay | 1.0 | 1.00 | 6 | 1,500 | 1,282 | 1,469 | 2.76 | N/A | N/A | 0.971 | N/A | 0.458 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.49 |
| 13.50 | 15.42 | 0.33 | 2.16 | clayey silt to silty clay | 0.0 | 1.00 | 8 | 1,620 | 1,339 | 1,526 | 2.67 | N/A | N/A | 0.969 | N/A | 0.472 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.49 |
| 14.50 | 18.57 | 0.34 | 1.84 | sandy silt to clayey silt | -1.0 | 1.66 | 12 | 1,740 | 1,397 | 1,584 | 2.29 | 1.93 | 70.96 | 0.966 | 1.000 | 0.485 | 0.113 | 0.300 | YES | 2.8 | 16.6 | 835 | 21.6 | N/A | 1.404 | 0.17 | 0.32 |
| 15.50 | 8.82 | 0.17 | 1.92 | clayey silt to silty clay | -2.0 | 1.00 | 4 | 1,860 | 1,454 | 1,642 | 2.87 | N/A | N/A | 0.964 | N/A | 0.497 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 16.50 | 9.37 | 0.16 | 1.67 | clayey silt to silty clay | -3.0 | 1.00 | 5 | 1,980 | 1,512 | 1,699 | 2.83 | N/A | N/A | 0.962 | N/A | 0.507 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 17.50 | 13.27 | 0.22 | 1.66 | clayey silt to silty clay | -4.0 | 1.00 | 7 | 2,100 | 1,570 | 1,757 | 2.70 | N/A | N/A | 0.959 | N/A | 0.517 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 18.50 | 40.65 | 0.28 | 0.69 | silty sand to sandy silt | -5.0 | 1.66 | 22 | 2,220 | 1,627 | 1,814 | 1.81 | 1.00 | 74.62 | 0.957 | 1.000 | 0.526 | 0.119 | 0.290 | YES | 2.8 | 26.4 | 1,200 | 33.3 | N/A | 0.095 | 0.01 | 0.31 |
| 19.50 | 17.78 | 0.43 | 2.41 | clayey silt to silty clay | -6.0 | 1.00 | 9 | 2,340 | 1,685 | 1,872 | 2.71 | N/A | N/A | 0.955 | N/A | 0.534 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 20.50 | 13.77 | 0.49 | 3.60 | silty clay to clay | -7.0 | 1.00 | 9 | 2,460 | 1,742 | 1,930 | 2.92 | N/A | N/A | 0.952 | N/A | 0.542 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 21.50 | 12.77 | 0.47 | 3.71 | silty clay to clay | -8.0 | 1.00 | 9 | 2,580 | 1,800 | 1,987 | 2.96 | N/A | N/A | 0.950 | N/A | 0.549 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 22.50 | 14.80 | 0.54 | 3.66 | silty clay to clay | -9.0 | 1.00 | 10 | 2,700 | 1,858 | 2,045 | 2.91 | N/A | N/A | 0.948 | N/A | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.31 |
| 23.50 | 41.10 | 0.85 | 2.08 | sandy silt to clayey silt | -10.0 | 1.00 | 16 | 2,820 | 1,915 | 2,102 | 2.41 | 2.36 | 99.29 | 0.945 | 1.000 | 0.561 | 0.171 | 0.392 | YES | 2.8 | 18.8 | 1,063 | 24.2 | N/A | 1.243 | 0.15 | 0.16 |
| 24.50 | 22.93 | 0.87 | 3.81 | silty clay to clay | -11.0 | 1.00 | 15 | 2,940 | 1,973 | 2,160 | 2.79 | N/A | N/A | 0.943 | N/A | 0.566 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 25.50 | 13.23 | 0.49 | 3.71 | silty clay to clay | -12.0 | 1.00 | 9 | 3,060 | 2,030 | 2,218 | 2.99 | N/A | N/A | 0.941 | N/A | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 26.50 | 20.05 | 0.92 | 4.57 | clay | -13.0 | 1.00 | 20 | 3,180 | 2,088 | 2,275 | 2.90 | N/A | N/A | 0.938 | N/A | 0.576 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.16 |
| 27.50 | 73.20 | 1.35 | 1.85 | silty sand to sandy silt | -14.0 | 1.00 | 24 | 3,300 | 2,146 | 2,333 | 2.21 | 1.68 | 118.82 | 0.936 | 0.975 | 0.580 | 0.236 | 0.510 | YES | 2.8 | 25.4 | 1,200 | 32.1 | N/A | 0.341 | 0.04 | 0.12 |
| 28.50 | 154.32 | 1.11 | 0.72 | sand | -15.0 | 1.00 | 31 | 3,420 | 2,203 | 2,390 | 1.69 | 1.03 | 151.99 | 0.934 | 0.962 | 0.584 | 0.407 | 0.860 | YES | 0.0 | 28.2 | 1,200 | 28.2 | N/A | 0.924 | 0.11 | 0.01 |
| 29.50 | 201.75 | 1.13 | 0.56 | sand | -16.0 | 1.00 | 40 | 3,540 | 2,261 | 2,448 | 1.54 | 1.00 | 189.76 | 0.931 | 0.952 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 36.5 | N/A | 0.059 | 0.01 | 0.00 |
| 30.50 | 295.42 | 1.15 | 0.39 | gravelly sand to sand | -17.0 | 1.00 | 49 | 3,660 | 2,318 | 2,506 | 1.31 | 1.00 | 274.38 | 0.926 | 0.943 | 0.589 | N/A | N/A | NO | N/A | N/A | N/A | 44.0 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | 276.09 | 1.61 | 0.58 | sand | -18.0 | 1.00 | 55 | 3,780 | 2,376 | 2,563 | 1.45 | 1.00 | 253.30 | 0.918 | 0.933 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 48.8 | N/A | 0.000 | 0.00 | 0.00 |
| 32.50 | 292.65 | 1.33 | 0.45 | gravelly sand to sand | -19.0 | 1.00 | 49 | 3,900 | 2,434 | 2,621 | 1.37 | 1.00 | 265.30 | 0.909 | 0.925 | 0.587 | N/A | N/A | NO | N/A | N/A | N/A | 42.6 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | 317.98 | 1.77 | 0.56 | gravelly sand to sand | -20.0 | 1.00 | 53 | 4,020 | 2,491 | 2,678 | 1.40 | 1.00 | 284.91 | 0.901 | 0.916 | 0.586 | N/A | N/A | NO | N/A | N/A | N/A | 45.8 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | 366.65 | 1.41 | 0.38 | gravelly sand to sand | -21.0 | 1.00 | 61 | 4,140 | 2,549 | 2,736 | 1.25 | 1.00 | 324.79 | 0.893 | 0.908 | 0.585 | N/A | N/A | NO | N/A | N/A | N/A | 52.2 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 416.12 | 1.80 | 0.43 | gravelly sand to sand | -22.0 | 1.00 | 69 | 4,260 | 2,606 | 2,794 | 1.25 | 1.00 | 364.51 | 0.885 | 0.899 | 0.583 | N/A | N/A | NO | N/A | N/A | N/A | 58.7 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 544.02 | 3.30 | 0.61 | gravelly sand to sand | -23.0 | 1.00 | 91 | 4,380 | 2,664 | 2,851 | 1.28 | 1.00 | 471.37 | 0.877 | 0.892 | 0.581 | N/A | N/A | NO | N/A | N/A | N/A | 75.9 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 622.00 | 3.04 | 0.49 | gravelly sand to sand | -24.0 | 1.00 | 104 | 4,500 | 2,722 | 2,909 | 1.18 | 1.00 | 533.20 | 0.869 | 0.884 | 0.579 | N/A | N/A | NO | N/A | N/A | N/A | 86.0 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 642.33 | 5.78 | 0.90 | gravelly sand to sand | -25.0 | 1.00 | 107 | 4,620 | 2,779 | 2,966 | 1.39 | 1.00 | 544.90 | 0.861 | 0.877 | 0.577 | N/A | N/A | NO | N/A | N/A | N/A | 87.9 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 563.43 | 3.05 | 0.54 | gravelly sand to sand | -26.0 | 1.00 | 94 | 4,740 | 2,837 | 3,024 | 1.24 | 1.00 | 473.09 | 0.852 | 0.870 | 0.574 | N/A | N/A | NO | N/A | N/A | N/A | 76.4 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 459.15 | 1.59 | 0.35 | gravelly sand to sand | -27.0 | 1.00 | 77 | 4,860 | 2,894 | 3,082 | 1.17 | 1.00 | 381.67 | 0.844 | 0.863 | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | 61.6 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 390.20 | 2.24 | 0.57 | gravelly sand to sand | -28.0 | 1.00 | 65 | 4,980 | 2,952 | 3,139 | 1.38 | 1.00 | 321.18 | 0.836 | 0.856 | 0.568 | N/A | N/A | NO | N/A | N/A | N/A | 51.9 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 610.42 | 4.63 | 0.76 | gravelly sand to sand | -29.0 | 1.00 | 102 | 5,100 | 3,010 | 3,197 | 1.35 | 1.00 | 497.61 | 0.828 | 0.849 | 0.565 | N/A | N/A | NO | N/A | N/A | N/A | 80.5 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 536.42 | 2.50 | 0.47 | gravelly sand to sand | -30.0 | 1.00 | 89 | 5,220 | 3,067 | 3,254 | 1.22 | 1.00 | 433.16 | 0.820 | 0.843 | 0.562 | N/A | N/A | NO | N/A | N/A | N/A | 70.1 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 465.87 | 2.45 | 0.53 | gravelly sand to sand | -31.0 | 1.00 | 78 | 5,340 | 3,125 | 3,312 | 1.30 | 1.00 | 372.71 | 0.812 | 0.837 | 0.559 | N/A | N/A | NO | N/A | N/A | N/A | 60.3 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 469.73 | 3.37 | 0.72 | gravelly sand to sand | -32.0 | 1.00 | 78 | 5,460 | 3,182 | 3,370 | 1.40 | 1.00 | 372.39 | 0.804 | 0.830 | 0.556 | N/A | N/A | NO | N/A | N/A | N/A | 60.3 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 641.13 | 3.10 | 0.48 | gravelly sand to sand | -33.0 | 1.00 | 107 | 5,580 | 3,240 | 3,427 | 1.19 | 1.00 | 503.73 | 0.795 | 0.825 | 0.552 | N/A | N/A | NO | N/A | N/A | N/A | 81.6 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 653.83 | 3.45 | 0.53 | gravelly sand to sand | -34.0 | 1.00 | 109 | 5,700 | 3,298 | 3,485 | 1.21 | 1.00 | 509.20 | 0.787 | 0.819 | 0.548 | N/A | N/A | NO | N/A | N/A | N/A | 82.6 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 524.28 | 4.28 | 0.82 | gravelly sand to sand | -35.0 | 1.00 | 87 | 5,820 | 3,355 | 3,542 | 1.42 | 1.00 | 404.79 | 0.779 | 0.813 | 0.545 | N/A | N/A | NO | N/A | N/A | N/A | 65.7 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 551.02 | 4.84 | 0.88 | gravelly sand to sand | -36.0 | 1.00 | 92 | 5,940 | 3,413 | 3,600 | 1.44 | 1.00 | 421.82 | 0.771 | 0.808 | 0.541 | N/A | N/A | NO | N/A | N/A | N/A | 68.5 | N/A | 0.000 | 0.00 | 0.00 |
| 50.50 | 604.58 | 3.46 | 0.57 | gravelly sand to sand | -37.0 | 1.00 | 101 | 6,060 | 3,470 | 3,658 | 1.27 | 1.00 | 458.97 | 0.763 | 0.802 | 0.537 | N/A | N/A | NO | N/A | N/A | N/A | 74.5 | N/A | 0.000 | 0.00 | 0.00 |
| 51.50 | 675.42 | 4.87 | 0.72 | gravelly sand to sand | -38.0 | 1.00 | 113 | 6,180 | 3,528 | 3,715 | 1.32 | 1.00 | 508.54 | 0.755 | 0.797 | 0.533 | N/A | N/A | NO | N/A | N/A | N/A | 82.6 | N/A | 0.000 | 0.00 | 0.00 |
| 52.50 | 520.21 | 6.02 | 1.16 | sand | -39.0 | 1.00 | 104 | 6,300 | 3,586 | 3,773 | 1.56 | 1.00 | 388.53 | 0.747 | 0.792 | 0.529 | N/A | N/A | NO | N/A | N/A | N/A | 75.8 | N/A | 0.000 | 0.00 | 0.00 |
| 53.50 | 608.55 | 4.25 | 0.70 | gravelly sand to sand | -40.0 | 1.00 | 101 | 6,420 | 3,643 | 3,830 | 1.34 | 1.00 | 450.89 | 0.739 | 0.787 | 0.524 | N/A | N/A | NO | N/A | N/A | N/A | 73.3 | N/A | 0.000 | 0.00 | 0.00 |
| 54.50 | 528.70 | 5.28 | 1.00 | sand | -41.0 | 1.00 | 106 | 6,540 | 3,701 | 3,888 | 1.51 | 1.00 | 388.67 | 0.730 | 0.782 | 0.520 | N/A | N/A | NO | N/A | N/A | N/A | 75.8 | N/A | 0.000 | 0.00 | 0.00 |
| 55.50 | 682.62 | 4.38 | 0.64 | gravelly sand to sand | -42.0 | 1.00 | 114 | 6,660 | 3,758 | 3,946 | 1.29 | 1.00 | 497.96 | 0.722 | 0.777 | 0.516 | N/A | N/A | NO | N/A | N/A | N/A | 81.0 | N/A | 0.000 | 0.00 | 0.00 |
| 56.50 | 605.00 | 3.28 | 0.54 | gravelly sand to sand | -43.0 | 1.00 | 101 | 6,780 | 3,816 | 4,003 | 1.27 | 1.00 | 438.00 | 0.714 | 0.772 | 0.511 | N/A | N/A | NO | N/A | N/A | N/A | 71.3 | N/A | 0.000 | 0.00 | 0.00 |
| 57.50 | 479.98 | 3.79 | 0.79 | gravelly sand to sand | -44.0 | 1.00 | 80 | 6,900 | 3,874 | 4,061 | 1.46 | 1.00 | 344.89 | 0.706 | 0.768 | 0.507 | N/A | N/A | NO | N/A | N/A | N/A | 56.1 | N/A | 0.000 | 0.00 | 0.00 |
| 58.50 | 421.85 | 5.01 | 1.19 | sand | -45.0 | 1.00 | 84 | 7,020 | 3,931 | 4,118 | 1.63 | 1.00 | 300.89 | 0.698 | 0.763 | 0.502 | N/A | N/A | NO | N/A | N/A | N/A | 58.8 | N/A | 0.000 | 0.00 | 0.00 |
| 59.50 | 411.82 | 3.85 | 0.94 | sand | -46.0 | 1.00 | 82 | 7,140 | 3,989 | 4,176 | 1.56 | 1.00 | 291.61 | 0.690 | 0.759 | 0.498 | N/A | N/A | NO | N/A | N/A | N/A | 57.0 | N/A | 0.000 | 0.00 | 0.00 |
| 60.50 | 468.05 | 3.21 | 0.69 | gravelly sand to sand | -47.0 | 1.00 | 78 | 7,260 | 4,046 | 4,234 | 1.43 | 1.00 | 329.06 | 0.682 | 0.754 | 0.493 | N/A | N/A | NO | N/A | N/A | N/A | 53.6 | N/A | 0.000 | 0.00 | 0.00 |
| 61.50 | 488.12 | 4.05 | 0.83 | gravelly sand to sand | -48.0 | 1.00 | 81 | 7,380 | 4,104 | 4,291 | 1.48 | 1.00 | 340.75 | 0.673 | 0.750 | 0.488 | N/A | N/A | NO | N/A | N/A | N/A | 55.5 | N/A | 0.000 | 0.00 | 0.00 |
| 62.50 | 511.93 | 4.13 | 0.81 | gravelly sand to sand | -49.0 | 1.00 | 85 | 7,500 | 4,162 | 4,349 | 1.46 | 1.00 | 354.89 | 0.665 | 0.746 | 0.483 | N/A | N/A | NO | N/A | N/A | N/A | 57.9 | N/A | 0.000 | 0.00 | 0.00 |
| 63.50 | 427.88 | 4.10 | 0.96 | sand | -50.0 | 1.00 | 86 | 7,620 | 4,219 | 4,406 | 1.57 | 1.00 | 294.60 | 0.657 | 0.742 | 0.478 | N/A | N/A | NO | N/A | N/A | N/A | 57.7 | N/A | 0.000 | 0.00 | 0.00 |
| 64.50 | 490.93 | 5.00 | 1.02 | sand | -51.0 | 1.00 | 98 | 7,740 | 4,277 | 4,464 | 1.55 | 1.00 | 335.72 | 0.649 | 0.738 | 0.473 | N/A | N/A | NO | N/A | N/A | N/A | 65.7 | N/A | 0.000 | 0.00 | 0.00 |
| 65.50 | 564.30 | 4.75 | 0.84 | gravelly sand to sand | -52.0 | 1.00 | 94 | 7,860 | 4,334 | 4,522 | 1.45 | 1.00 | 383.32 | 0.641 | 0.734 | 0.468 | N/A | N/A | NO | N/A | N/A | N/A | 62.6 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

max= 1,200
min= 680
avg= 1,030

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-08 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | 8.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v$/$\sigma_v$') $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 6.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 4.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.47 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.47 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 100.55 | 0.84 | 0.84 | sand to silty sand | 13.0 | 1.00 | 25 | 60 | 60 | 60 | 1.34 | 1.00 | 580.53 | 0.999 | N/A | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | 47.3 | 0.035 | 0.000 | 0.00 | 0.47 |
| 1.50 | 127.15 | 1.12 | 0.88 | sand to silty sand | 12.0 | 1.00 | 32 | 180 | 180 | 180 | 1.44 | 1.00 | 423.83 | 0.997 | N/A | 0.402 | N/A | N/A | NO | N/A | N/A | N/A | 59.1 | 0.056 | 0.000 | 0.00 | 0.47 |
| 2.50 | 96.10 | 0.90 | 0.94 | sand to silty sand | 11.0 | 1.00 | 24 | 300 | 300 | 300 | 1.60 | 1.00 | 248.13 | 0.994 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 45.3 | 0.078 | 0.000 | 0.00 | 0.47 |
| 3.50 | 50.65 | 0.61 | 1.21 | silty sand to sandy silt | 10.0 | 1.66 | 28 | 420 | 420 | 420 | 1.62 | 1.00 | 183.00 | 0.992 | N/A | 0.400 | N/A | N/A | NO | N/A | N/A | N/A | 62.0 | 0.082 | 0.000 | 0.00 | 0.47 |
| 4.50 | 23.32 | 0.24 | 1.04 | sandy silt to clayey silt | 9.0 | 1.00 | 9 | 540 | 540 | 540 | 2.20 | 1.67 | 74.94 | 0.990 | N/A | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 24.0 | N/A | N/A | N/A | 0.47 |
| 5.50 | 18.83 | 0.18 | 0.97 | sandy silt to clayey silt | 8.0 | 1.00 | 8 | 660 | 660 | 660 | 2.30 | 1.95 | 63.90 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 20.4 | N/A | N/A | N/A | 0.47 |
| 6.50 | 9.42 | 0.30 | 3.19 | silty clay to clay | 7.0 | 1.00 | 6 | 780 | 780 | 749 | 2.80 | N/A | N/A | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 7.50 | 21.03 | 0.87 | 4.13 | silty clay to clay | 6.0 | 1.00 | 14 | 900 | 900 | 806 | 2.64 | N/A | N/A | 0.983 | N/A | 0.396 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 8.50 | 21.23 | 0.52 | 2.44 | clayey silt to silty clay | 5.0 | 1.00 | 11 | 1,020 | 1,020 | 864 | 2.57 | 3.15 | 93.59 | 0.980 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 9.50 | 13.28 | 0.29 | 2.21 | clayey silt to silty clay | 4.0 | 1.00 | 7 | 1,140 | 1,109 | 922 | 2.67 | N/A | N/A | 0.978 | N/A | 0.405 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 10.50 | 14.10 | 0.36 | 2.59 | clayey silt to silty clay | 3.0 | 1.00 | 7 | 1,260 | 1,166 | 979 | 2.71 | N/A | N/A | 0.976 | N/A | 0.425 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 11.50 | 11.97 | 0.37 | 3.07 | silty clay to clay | 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,037 | 2.83 | N/A | N/A | 0.973 | N/A | 0.442 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 12.50 | 9.47 | 0.27 | 2.83 | silty clay to clay | 1.0 | 1.00 | 6 | 1,500 | 1,282 | 1,094 | 2.90 | N/A | N/A | 0.971 | N/A | 0.458 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 13.50 | 11.03 | 0.25 | 2.23 | clayey silt to silty clay | 0.0 | 1.00 | 6 | 1,620 | 1,339 | 1,152 | 2.80 | N/A | N/A | 0.969 | N/A | 0.472 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 14.50 | 10.48 | 0.21 | 1.98 | clayey silt to silty clay | -1.0 | 1.00 | 5 | 1,740 | 1,397 | 1,210 | 2.80 | N/A | N/A | 0.966 | N/A | 0.485 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 15.50 | 9.72 | 0.19 | 1.92 | clayey silt to silty clay | -2.0 | 1.00 | 5 | 1,860 | 1,454 | 1,267 | 2.84 | N/A | N/A | 0.964 | N/A | 0.497 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 16.50 | 10.58 | 0.21 | 1.99 | clayey silt to silty clay | -3.0 | 1.00 | 5 | 1,980 | 1,512 | 1,325 | 2.82 | N/A | N/A | 0.962 | N/A | 0.507 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 17.50 | 22.05 | 0.60 | 2.74 | clayey silt to silty clay | -4.0 | 1.00 | 11 | 2,100 | 1,570 | 1,382 | 2.65 | N/A | N/A | 0.959 | N/A | 0.517 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.47 |
| 18.50 | 20.73 | 0.39 | 1.87 | sandy silt to clayey silt | -5.0 | 1.66 | 14 | 2,220 | 1,627 | 1,440 | 2.28 | 1.90 | 72.32 | 0.957 | 1.000 | 0.526 | 0.115 | 0.281 | YES | 2.8 | 19.0 | 1,079 | 24.4 | N/A | 1.210 | 0.15 | 0.33 |
| 19.50 | 10.17 | 0.29 | 2.91 | silty clay to clay | -6.0 | 1.00 | 7 | 2,340 | 1,685 | 1,498 | 2.97 | N/A | N/A | 0.955 | N/A | 0.534 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.33 |
| 20.50 | 11.79 | 0.39 | 3.33 | silty clay to clay | -7.0 | 1.00 | 8 | 2,460 | 1,742 | 1,555 | 2.96 | N/A | N/A | 0.952 | N/A | 0.542 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.33 |
| 21.50 | 23.73 | 0.68 | 2.88 | clayey silt to silty clay | -8.0 | 1.00 | 12 | 2,580 | 1,800 | 1,613 | 2.67 | N/A | N/A | 0.950 | N/A | 0.549 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.33 |
| 22.50 | 20.55 | 0.76 | 3.74 | silty clay to clay | -9.0 | 1.00 | 14 | 2,700 | 1,858 | 1,670 | 2.80 | N/A | N/A | 0.948 | N/A | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.33 |
| 23.50 | 14.70 | 0.67 | 4.56 | clay | -10.0 | 1.00 | 15 | 2,820 | 1,915 | 1,728 | 2.99 | N/A | N/A | 0.945 | N/A | 0.561 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.33 |
| 24.50 | 13.03 | 0.38 | 2.94 | silty clay to clay | -11.0 | 1.00 | 9 | 2,940 | 1,973 | 1,786 | 2.92 | N/A | N/A | 0.943 | N/A | 0.566 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.33 |
| 25.50 | 30.22 | 0.76 | 2.51 | sandy silt to clayey silt | -12.0 | 1.00 | 12 | 3,060 | 2,030 | 1,843 | 2.58 | 3.22 | 96.57 | 0.941 | 0.996 | 0.571 | 0.164 | 0.367 | YES | 2.8 | 15.4 | 716 | 20.1 | N/A | 1.545 | 0.19 | 0.14 |
| 26.50 | 59.30 | 0.97 | 1.64 | silty sand to sandy silt | -13.0 | 1.00 | 20 | 3,180 | 2,088 | 1,901 | 2.24 | 1.76 | 102.30 | 0.938 | 0.986 | 0.576 | 0.180 | 0.395 | YES | 2.8 | 23.1 | 1,200 | 29.3 | N/A | 0.774 | 0.09 | 0.05 |
| 27.50 | 157.37 | 0.75 | 0.48 | sand | -14.0 | 1.00 | 31 | 3,300 | 2,146 | 1,958 | 1.57 | 1.00 | 151.93 | 0.936 | 0.972 | 0.580 | 0.406 | 0.875 | YES | 0.0 | 31.8 | 1,200 | 31.8 | N/A | 0.415 | 0.05 | 0.00 |
| 28.50 | 259.50 | 0.75 | 0.29 | gravelly sand to sand | -15.0 | 1.00 | 43 | 3,420 | 2,203 | 2,016 | 1.27 | 1.00 | 247.24 | 0.934 | 0.962 | 0.584 | N/A | N/A | NO | N/A | N/A | N/A | 43.1 | N/A | 0.000 | 0.00 | 0.00 |
| 29.50 | 380.13 | 3.52 | 0.93 | sand | -16.0 | 1.00 | 76 | 3,540 | 2,261 | 2,074 | 1.50 | 1.00 | 357.54 | 0.931 | 0.952 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 74.7 | N/A | 0.000 | 0.00 | 0.00 |
| 30.50 | 456.05 | 3.58 | 0.79 | gravelly sand to sand | -17.0 | 1.00 | 76 | 3,660 | 2,318 | 2,131 | 1.40 | 1.00 | 423.58 | 0.926 | 0.943 | 0.589 | N/A | N/A | NO | N/A | N/A | N/A | 73.6 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | 479.36 | 1.62 | 0.34 | gravelly sand to sand | -18.0 | 1.00 | 80 | 3,780 | 2,376 | 2,189 | 1.12 | 1.00 | 439.80 | 0.918 | 0.933 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 76.4 | N/A | 0.000 | 0.00 | 0.00 |
| 32.50 | 475.63 | 2.21 | 0.46 | gravelly sand to sand | -19.0 | 1.00 | 79 | 3,900 | 2,434 | 2,246 | 1.22 | 1.00 | 431.18 | 0.909 | 0.925 | 0.587 | N/A | N/A | NO | N/A | N/A | N/A | 74.8 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | 578.03 | 2.17 | 0.38 | gravelly sand to sand | -20.0 | 1.00 | 96 | 4,020 | 2,491 | 2,304 | 1.10 | 1.00 | 517.92 | 0.901 | 0.916 | 0.586 | N/A | N/A | NO | N/A | N/A | N/A | 89.8 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 716 |
| avg= | 1,049 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-09 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 16.00 ft |
| GWT Elev. During Test | 2.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

GWT Depth During Test, Zw = 14.00 ft below ground surface
GWT Depth For Design, Zwd = 11.00 ft below ground surface

***** SUMMARY OF RESULTS *****

Total Thickness of Liquefiable Soils = 1.00 feet
Earthquake-Induced Settlements:
- Liquefaction-Induced Settlement = 0.10 inches <--- Saturated Sands
- Seismic Compaction Settlement = 0.01 inches <--- Dry or Unsaturated Sands

Total: 0.12 inches

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 104.10 | 0.68 | 0.65 | sand to silty sand |
| 6.50 | 77.50 | 0.69 | 0.90 | sand to silty sand |
| 7.50 | 34.78 | 0.48 | 1.37 | silty sand to sandy silt |
| 8.50 | 11.33 | 0.15 | 1.32 | clayey silt to silty clay |
| 9.50 | 3.95 | 0.06 | 1.39 | sensitive fine grained |
| 10.50 | 12.36 | 0.56 | 4.51 | clay |
| 11.50 | 16.97 | 0.82 | 4.80 | clay |
| 12.50 | 11.10 | 0.46 | 4.09 | clay |
| 13.50 | 9.50 | 0.27 | 2.78 | silty clay to clay |
| 14.50 | 11.13 | 0.33 | 2.99 | silty clay to clay |
| 15.50 | 11.32 | 0.35 | 3.09 | silty clay to clay |
| 16.50 | 12.85 | 0.43 | 3.35 | silty clay to clay |
| 17.50 | 10.00 | 0.27 | 2.65 | silty clay to clay |
| 18.50 | 7.47 | 0.17 | 2.20 | silty clay to clay |
| 19.50 | 9.23 | 0.20 | 2.13 | clayey silt to silty clay |
| 20.50 | 12.19 | 0.28 | 2.31 | clayey silt to silty clay |
| 21.50 | 13.57 | 0.25 | 1.84 | clayey silt to silty clay |
| 22.50 | 8.60 | 0.27 | 3.14 | clay |
| 23.50 | 10.73 | 0.47 | 4.34 | clay |
| 24.50 | 23.30 | 0.82 | 3.53 | clayey silt to silty clay |
| 25.50 | 24.88 | 1.00 | 4.00 | silty clay to clay |
| 26.50 | 19.82 | 0.70 | 3.51 | silty clay to clay |
| 27.50 | 16.92 | 0.64 | 3.79 | silty clay to clay |
| 28.50 | 13.93 | 0.45 | 3.21 | silty clay to clay |
| 29.50 | 18.62 | 0.54 | 2.88 | clayey silt to silty clay |
| 30.50 | 18.38 | 0.52 | 2.82 | clayey silt to silty clay |
| 31.50 | 18.39 | 0.40 | 2.18 | clayey silt to silty clay |
| 32.50 | 116.57 | 1.05 | 0.90 | sand to silty sand |
| 33.50 | 457.20 | 1.89 | 0.41 | gravelly sand to sand |
| 34.50 | 454.32 | 1.94 | 0.43 | gravelly sand to sand |
| 35.50 | 423.93 | 1.62 | 0.38 | gravelly sand to sand |
| 36.50 | 504.65 | 3.49 | 0.69 | gravelly sand to sand |
| 37.50 | 501.93 | 3.15 | 0.63 | gravelly sand to sand |
| 38.50 | 808.70 | 6.56 | 0.81 | gravelly sand to sand |
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**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.50 | 10.0 | 1.00 | 26 | 660 | 660 | 660 | 1.59 | 1.00 | 181.21 | 0.987 | N/A | 0.398 | N/A | N/A | NO |
| 6.50 | 9.0 | 1.66 | 32 | 780 | 780 | 780 | 1.50 | 1.00 | 205.48 | 0.985 | N/A | 0.397 | N/A | N/A | NO |
| 7.50 | 8.0 | 1.66 | 19 | 900 | 900 | 900 | 1.91 | 1.20 | 103.22 | 0.983 | N/A | 0.396 | N/A | N/A | NO |
| 8.50 | 7.0 | 1.66 | 9 | 1,020 | 1,020 | 1,020 | 2.34 | 2.10 | 55.08 | 0.980 | N/A | 0.395 | N/A | N/A | NO |
| 9.50 | 6.0 | 1.00 | 2 | 1,140 | 1,140 | 1,140 | 3.05 | N/A | N/A | 0.978 | N/A | 0.394 | N/A | N/A | NO |
| 10.50 | 5.0 | 1.00 | 12 | 1,260 | 1,260 | 1,260 | 2.93 | N/A | N/A | 0.976 | N/A | 0.393 | N/A | N/A | NO |
| 11.50 | 4.0 | 1.00 | 17 | 1,380 | 1,349 | 1,380 | 2.85 | N/A | N/A | 0.973 | N/A | 0.401 | N/A | N/A | NO |
| 12.50 | 3.0 | 1.00 | 11 | 1,500 | 1,406 | 1,500 | 2.97 | N/A | N/A | 0.971 | N/A | 0.417 | N/A | N/A | NO |
| 13.50 | 2.0 | 1.00 | 6 | 1,620 | 1,464 | 1,620 | 2.94 | N/A | N/A | 0.969 | N/A | 0.432 | N/A | N/A | NO |
| 14.50 | 1.0 | 1.00 | 7 | 1,740 | 1,522 | 1,709 | 2.91 | N/A | N/A | 0.966 | N/A | 0.445 | N/A | N/A | NO |
| 15.50 | 0.0 | 1.00 | 8 | 1,860 | 1,579 | 1,766 | 2.92 | N/A | N/A | 0.964 | N/A | 0.457 | N/A | N/A | NO |
| 16.50 | -1.0 | 1.00 | 9 | 1,980 | 1,637 | 1,824 | 2.91 | N/A | N/A | 0.962 | N/A | 0.469 | N/A | N/A | NO |
| 17.50 | -2.0 | 1.00 | 7 | 2,100 | 1,694 | 1,882 | 2.95 | N/A | N/A | 0.959 | N/A | 0.479 | N/A | N/A | NO |
| 18.50 | -3.0 | 1.00 | 5 | 2,220 | 1,752 | 1,939 | 3.03 | N/A | N/A | 0.957 | N/A | 0.489 | N/A | N/A | NO |
| 19.50 | -4.0 | 1.00 | 5 | 2,340 | 1,810 | 1,997 | 2.95 | N/A | N/A | 0.955 | N/A | 0.497 | N/A | N/A | NO |
| 20.50 | -5.0 | 1.00 | 6 | 2,460 | 1,867 | 2,054 | 2.87 | N/A | N/A | 0.952 | N/A | 0.506 | N/A | N/A | NO |
| 21.50 | -6.0 | 1.00 | 7 | 2,580 | 1,925 | 2,112 | 2.78 | N/A | N/A | 0.950 | N/A | 0.513 | N/A | N/A | NO |
| 22.50 | -7.0 | 1.00 | 9 | 2,700 | 1,982 | 2,170 | 3.10 | N/A | N/A | 0.948 | N/A | 0.520 | N/A | N/A | NO |
| 23.50 | -8.0 | 1.00 | 11 | 2,820 | 2,040 | 2,227 | 3.11 | N/A | N/A | 0.945 | N/A | 0.527 | N/A | N/A | NO |
| 24.50 | -9.0 | 1.00 | 12 | 2,940 | 2,098 | 2,285 | 2.78 | N/A | N/A | 0.943 | N/A | 0.533 | N/A | N/A | NO |
| 25.50 | -10.0 | 1.00 | 17 | 3,060 | 2,155 | 2,342 | 2.80 | N/A | N/A | 0.941 | N/A | 0.538 | N/A | N/A | NO |
| 26.50 | -11.0 | 1.00 | 13 | 3,180 | 2,213 | 2,400 | 2.85 | N/A | N/A | 0.938 | N/A | 0.543 | N/A | N/A | NO |
| 27.50 | -12.0 | 1.00 | 11 | 3,300 | 2,270 | 2,458 | 2.93 | N/A | N/A | 0.936 | N/A | 0.548 | N/A | N/A | NO |
| 28.50 | -13.0 | 1.00 | 9 | 3,420 | 2,328 | 2,515 | 2.97 | N/A | N/A | 0.934 | N/A | 0.553 | N/A | N/A | NO |
| 29.50 | -14.0 | 1.00 | 9 | 3,540 | 2,386 | 2,573 | 2.84 | N/A | N/A | 0.931 | N/A | 0.557 | N/A | N/A | NO |
| 30.50 | -15.0 | 1.00 | 9 | 3,660 | 2,443 | 2,630 | 2.85 | N/A | N/A | 0.926 | N/A | 0.559 | N/A | N/A | NO |
| 31.50 | -16.0 | 1.00 | 9 | 3,780 | 2,501 | 2,688 | 2.79 | N/A | N/A | 0.918 | N/A | 0.559 | N/A | N/A | NO |
| 32.50 | -17.0 | 1.00 | 29 | 3,900 | 2,558 | 2,746 | 1.88 | 1.17 | 120.35 | 0.909 | 0.912 | 0.559 | 0.242 | 0.508 | YES |
| 33.50 | -18.0 | 1.00 | 76 | 4,020 | 2,616 | 2,803 | 1.21 | 1.00 | 399.76 | 0.901 | 0.898 | 0.558 | N/A | N/A | NO |
| 34.50 | -19.0 | 1.00 | 76 | 4,140 | 2,674 | 2,861 | 1.22 | 1.00 | 392.94 | 0.893 | 0.890 | 0.557 | N/A | N/A | NO |
| 35.50 | -20.0 | 1.00 | 71 | 4,260 | 2,731 | 2,918 | 1.21 | 1.00 | 362.77 | 0.885 | 0.883 | 0.556 | N/A | N/A | NO |
| 36.50 | -21.0 | 1.00 | 84 | 4,380 | 2,789 | 2,976 | 1.35 | 1.00 | 427.36 | 0.877 | 0.875 | 0.555 | N/A | N/A | NO |
| 37.50 | -22.0 | 1.00 | 84 | 4,500 | 2,846 | 3,034 | 1.33 | 1.00 | 420.74 | 0.869 | 0.868 | 0.553 | N/A | N/A | NO |
| 38.50 | -23.0 | 1.00 | 135 | 4,620 | 2,904 | 3,091 | 1.30 | 1.00 | 671.13 | 0.861 | 0.861 | 0.552 | N/A | N/A | NO |

**RESIDUAL STRENGTH *** / **GROUND SETTLEMENT ****

| Soil Depth During Test (ft) | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 5.50 | N/A | N/A | N/A | 48.9 | 0.110 | 0.000 | 0.00 | 0.12 |
| 6.50 | N/A | N/A | N/A | 56.3 | 0.113 | 0.000 | 0.00 | 0.12 |
| 7.50 | N/A | N/A | N/A | 39.3 | 0.136 | 0.104 | 0.01 | 0.10 |
| 8.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 9.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 10.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 11.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 12.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 13.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 14.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 15.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 16.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 17.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 18.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 19.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 20.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 22.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 23.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 24.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 25.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 26.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 27.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 28.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 29.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 30.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 31.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.10 |
| 32.50 | 1.3 | 26.2 | 1,200 | 28.6 | N/A | 0.862 | 0.10 | 0.00 |
| 33.50 | N/A | N/A | N/A | 64.4 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | N/A | N/A | N/A | 63.3 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | N/A | N/A | N/A | 58.5 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | N/A | N/A | N/A | 69.0 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | N/A | N/A | N/A | 67.9 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | N/A | N/A | N/A | 108.4 | N/A | 0.000 | 0.00 | 0.00 |

max= 1,200
min= 1,200
avg= 1,200

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

(Engineer: Curt Scheyhing)

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-10 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 9.00 ft |
| GWT Elev. During Test | -4.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v$/$\sigma_v$') $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \text{--->}}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 13.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 4.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 4.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.32 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.32 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 5.50 | 18.78 | 0.83 | 4.43 | clay |
| 6.50 | 13.53 | 0.43 | 3.22 | silty clay to clay |
| 7.50 | 9.62 | 0.25 | 2.64 | silty clay to clay |
| 8.50 | 9.00 | 0.28 | 3.12 | silty clay to clay |
| 9.50 | 9.85 | 0.31 | 3.15 | silty clay to clay |
| 10.50 | 13.20 | 0.38 | 2.87 | clayey silt to silty clay |
| 11.50 | 11.82 | 0.35 | 2.93 | silty clay to clay |
| 12.50 | 9.62 | 0.23 | 2.40 | silty clay to clay |
| 13.50 | 11.40 | 0.17 | 1.51 | clayey silt to silty clay |
| 14.50 | 14.87 | 0.34 | 2.33 | clayey silt to silty clay |
| 15.50 | 21.05 | 0.53 | 2.52 | clayey silt to silty clay |
| 16.50 | 10.58 | 0.31 | 2.93 | silty clay to clay |
| 17.50 | 8.95 | 0.38 | 4.24 | clay |
| 18.50 | 18.82 | 0.68 | 3.59 | silty clay to clay |
| 19.50 | 19.38 | 0.71 | 3.65 | silty clay to clay |
| 20.50 | 19.86 | 0.90 | 4.53 | clay |
| 21.50 | 13.25 | 0.52 | 3.94 | clay |
| 22.50 | 23.90 | 0.81 | 3.38 | clayey silt to silty clay |
| 23.50 | 51.67 | 1.58 | 3.05 | sandy silt to clayey silt |
| 24.50 | 54.90 | 1.51 | 2.74 | sandy silt to clayey silt |
| 25.50 | 99.30 | 1.03 | 1.04 | sand to silty sand |
| 26.50 | 258.83 | 0.74 | 0.29 | gravelly sand to sand |
| 27.50 | 474.33 | 2.94 | 0.62 | gravelly sand to sand |
| 28.50 | 435.13 | 1.73 | 0.40 | gravelly sand to sand |
| 29.50 | 542.80 | 2.72 | 0.50 | gravelly sand to sand |
| 30.50 | 660.30 | 2.61 | 0.40 | gravelly sand to sand |
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**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.50 | 3.0 | 1.00 | 19 | 660 | 566 | 660 | 2.59 | 3.25 | 157.09 | 0.987 | 1.000 | 0.464 | 0.441 | 1.221 | YES |
| 6.50 | 2.0 | 1.00 | 9 | 780 | 624 | 780 | 2.62 | N/A | N/A | 0.985 | N/A | 0.496 | N/A | N/A | NO |
| 7.50 | 1.0 | 1.00 | 6 | 900 | 682 | 900 | 2.70 | N/A | N/A | 0.983 | N/A | 0.523 | N/A | N/A | NO |
| 8.50 | 0.0 | 1.00 | 6 | 1,020 | 739 | 1,020 | 2.80 | N/A | N/A | 0.980 | N/A | 0.545 | N/A | N/A | NO |
| 9.50 | -1.0 | 1.00 | 7 | 1,140 | 797 | 1,140 | 2.79 | N/A | N/A | 0.978 | N/A | 0.564 | N/A | N/A | NO |
| 10.50 | -2.0 | 1.00 | 7 | 1,260 | 854 | 1,260 | 2.68 | N/A | N/A | 0.976 | N/A | 0.580 | N/A | N/A | NO |
| 11.50 | -3.0 | 1.00 | 8 | 1,380 | 912 | 1,380 | 2.74 | N/A | N/A | 0.973 | N/A | 0.593 | N/A | N/A | NO |
| 12.50 | -4.0 | 1.00 | 6 | 1,500 | 970 | 1,500 | 2.78 | N/A | N/A | 0.971 | N/A | 0.605 | N/A | N/A | NO |
| 13.50 | -5.0 | 1.00 | 6 | 1,620 | 1,027 | 1,589 | 2.62 | N/A | N/A | 0.969 | N/A | 0.616 | N/A | N/A | NO |
| 14.50 | -6.0 | 1.00 | 7 | 1,740 | 1,085 | 1,646 | 2.64 | N/A | N/A | 0.966 | N/A | 0.625 | N/A | N/A | NO |
| 15.50 | -7.0 | 1.00 | 11 | 1,860 | 1,142 | 1,704 | 2.56 | 3.09 | 98.90 | 0.964 | 1.000 | 0.632 | 0.170 | 0.345 | YES |
| 16.50 | -8.0 | 1.00 | 7 | 1,980 | 1,200 | 1,762 | 2.86 | N/A | N/A | 0.962 | N/A | 0.639 | N/A | N/A | NO |
| 17.50 | -9.0 | 1.00 | 9 | 2,100 | 1,258 | 1,819 | 3.04 | N/A | N/A | 0.959 | N/A | 0.645 | N/A | N/A | NO |
| 18.50 | -10.0 | 1.00 | 13 | 2,220 | 1,315 | 1,877 | 2.74 | N/A | N/A | 0.957 | N/A | 0.651 | N/A | N/A | NO |
| 19.50 | -11.0 | 1.00 | 13 | 2,340 | 1,373 | 1,934 | 2.74 | N/A | N/A | 0.955 | N/A | 0.656 | N/A | N/A | NO |
| 20.50 | -12.0 | 1.00 | 20 | 2,460 | 1,430 | 1,992 | 2.81 | N/A | N/A | 0.952 | N/A | 0.660 | N/A | N/A | NO |
| 21.50 | -13.0 | 1.00 | 13 | 2,580 | 1,488 | 2,050 | 2.92 | N/A | N/A | 0.950 | N/A | 0.664 | N/A | N/A | NO |
| 22.50 | -14.0 | 1.00 | 12 | 2,700 | 1,546 | 2,107 | 2.68 | N/A | N/A | 0.948 | N/A | 0.667 | N/A | N/A | NO |
| 23.50 | -15.0 | 1.00 | 21 | 2,820 | 1,603 | 2,165 | 2.42 | 2.41 | 138.93 | 0.945 | 1.000 | 0.670 | 0.329 | 0.632 | YES |
| 24.50 | -16.0 | 1.00 | 22 | 2,940 | 1,661 | 2,222 | 2.38 | 2.22 | 133.66 | 0.943 | 1.000 | 0.673 | 0.302 | 0.577 | YES |
| 25.50 | -17.0 | 1.00 | 25 | 3,060 | 1,718 | 2,280 | 1.90 | 1.19 | 127.52 | 0.941 | 1.000 | 0.675 | 0.273 | 0.519 | YES |
| 26.50 | -18.0 | 1.00 | 43 | 3,180 | 1,776 | 2,338 | 1.23 | 1.00 | 274.67 | 0.938 | 1.000 | 0.677 | N/A | N/A | NO |
| 27.50 | -19.0 | 1.00 | 79 | 3,300 | 1,834 | 2,395 | 1.28 | 1.00 | 495.39 | 0.936 | 1.000 | 0.679 | N/A | N/A | NO |
| 28.50 | -20.0 | 1.00 | 73 | 3,420 | 1,891 | 2,453 | 1.16 | 1.00 | 447.47 | 0.934 | 1.000 | 0.680 | N/A | N/A | NO |
| 29.50 | -21.0 | 1.00 | 90 | 3,540 | 1,949 | 2,510 | 1.17 | 1.00 | 549.88 | 0.931 | 1.000 | 0.682 | N/A | N/A | NO |
| 30.50 | -22.0 | 1.00 | 110 | 3,660 | 2,006 | 2,568 | 1.05 | 1.00 | 659.25 | 0.926 | 0.999 | 0.681 | N/A | N/A | NO |

| Soil Depth During Test (ft) | RESIDUAL STRENGTH *: SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | GROUND SETTLEMENT **: Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 5.50 | 5.0 | 36.9 | 1,200 | N/A | N/A | 0.000 | 0.00 | 0.32 |
| 6.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 7.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 8.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 9.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 10.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 11.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 12.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 13.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 14.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 15.50 | 2.8 | 14.2 | 609 | N/A | N/A | 0.000 | 0.00 | 0.32 |
| 16.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 17.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 18.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 19.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 20.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 22.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.32 |
| 23.50 | 2.8 | 22.7 | 1,200 | 28.8 | N/A | 0.867 | 0.10 | 0.22 |
| 24.50 | 2.8 | 23.6 | 1,200 | 30.0 | N/A | 0.732 | 0.09 | 0.13 |
| 25.50 | 1.3 | 24.6 | 1,200 | 26.9 | N/A | 1.059 | 0.13 | 0.00 |
| 26.50 | N/A | N/A | N/A | 39.9 | N/A | 0.002 | 0.00 | 0.00 |
| 27.50 | N/A | N/A | N/A | 72.2 | N/A | 0.000 | 0.00 | 0.00 |
| 28.50 | N/A | N/A | N/A | 65.5 | N/A | 0.000 | 0.00 | 0.00 |
| 29.50 | N/A | N/A | N/A | 80.7 | N/A | 0.000 | 0.00 | 0.00 |
| 30.50 | N/A | N/A | N/A | 97.1 | N/A | 0.000 | 0.00 | 0.00 |

| | |
|---|---|
| max= | 1,200 |
| min= | 609 |
| avg= | 1,082 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-11 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 12.00 ft |
| GWT Elev. During Test | 7.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha\text{—>>}}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 5.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 7.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 1.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.17 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.17 inches | |

**INPUT SOIL PROFILE (CPT DATA)**

| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t\text{-}avg}$ (tsf) | Average Sleeve Friction $f_{s\text{-}avg}$ (tsf) | Average Friction Ratio $R_{f\text{-}avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) |
|---|---|---|---|---|
| 0.50 | 28.13 | 0.61 | 2.16 | sandy silt to clayey silt |
| 1.50 | 22.12 | 0.87 | 3.95 | silty clay to clay |
| 2.50 | 12.45 | 0.55 | 4.39 | clay |
| 3.50 | 10.05 | 0.46 | 4.59 | clay |
| 4.50 | 10.63 | 0.58 | 5.41 | clay |
| 5.50 | 8.95 | 0.40 | 4.50 | clay |
| 6.50 | 17.72 | 0.91 | 5.14 | clay |
| 7.50 | 14.50 | 0.80 | 5.48 | clay |
| 8.50 | 11.20 | 0.45 | 4.04 | clay |
| 9.50 | 8.13 | 0.27 | 3.30 | clay |
| 10.50 | 6.50 | 0.22 | 3.48 | clay |
| 11.50 | 6.53 | 0.22 | 3.40 | clay |
| 12.50 | 9.48 | 0.30 | 3.13 | silty clay to clay |
| 13.50 | 9.37 | 0.25 | 2.69 | silty clay to clay |
| 14.50 | 7.33 | 0.16 | 2.23 | silty clay to clay |
| 15.50 | 18.67 | 0.41 | 2.22 | clayey silt to silty clay |
| 16.50 | 13.15 | 0.26 | 1.98 | clayey silt to silty clay |
| 17.50 | 13.00 | 0.33 | 2.55 | clayey silt to silty clay |
| 18.50 | 10.62 | 0.27 | 2.60 | silty clay to clay |
| 19.50 | 10.53 | 0.39 | 3.70 | clay |
| 20.50 | 15.61 | 0.62 | 3.95 | silty clay to clay |
| 21.50 | 31.45 | 1.06 | 3.35 | clayey silt to silty clay |
| 22.50 | 37.02 | 1.58 | 4.26 | silty clay to clay |
| 23.50 | 25.62 | 1.12 | 4.38 | silty clay to clay |
| 24.50 | 16.22 | 0.45 | 2.74 | clayey silt to silty clay |
| 25.50 | 16.88 | 0.36 | 2.12 | clayey silt to silty clay |
| 26.50 | 24.82 | 0.57 | 2.28 | sandy silt to clayey silt |
| 27.50 | 42.58 | 0.53 | 1.25 | silty sand to sandy silt |
| 28.50 | 265.25 | 1.10 | 0.42 | gravelly sand to sand |
| 29.50 | 475.60 | 1.49 | 0.31 | gravelly sand to sand |
| | | | | #N/A |
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| | | | | #N/A |

**SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) +**

| Soil Depth During Test (ft) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.50 | 11.0 | 1.00 | 11 | 60 | 60 | 60 | 2.00 | 1.30 | 211.27 | 0.999 | N/A | 0.403 | N/A | N/A | NO |
| 1.50 | 10.0 | 1.00 | 15 | 180 | 180 | 180 | 2.42 | 2.41 | 177.71 | 0.997 | N/A | 0.402 | N/A | N/A | NO |
| 2.50 | 9.0 | 1.00 | 12 | 300 | 300 | 300 | 2.56 | 3.12 | 160.95 | 0.994 | N/A | 0.401 | N/A | N/A | NO |
| 3.50 | 8.0 | 1.00 | 10 | 420 | 420 | 420 | 2.72 | N/A | N/A | 0.992 | N/A | 0.400 | N/A | N/A | NO |
| 4.50 | 7.0 | 1.00 | 11 | 540 | 540 | 540 | 2.82 | N/A | N/A | 0.990 | N/A | 0.399 | N/A | N/A | NO |
| 5.50 | 6.0 | 1.00 | 9 | 660 | 660 | 629 | 2.87 | N/A | N/A | 0.987 | N/A | 0.398 | N/A | N/A | NO |
| 6.50 | 5.0 | 1.00 | 18 | 780 | 780 | 686 | 2.73 | N/A | N/A | 0.985 | N/A | 0.397 | N/A | N/A | NO |
| 7.50 | 4.0 | 1.00 | 15 | 900 | 869 | 744 | 2.84 | N/A | N/A | 0.983 | N/A | 0.410 | N/A | N/A | NO |
| 8.50 | 3.0 | 1.00 | 11 | 1,020 | 926 | 802 | 2.85 | N/A | N/A | 0.980 | N/A | 0.435 | N/A | N/A | NO |
| 9.50 | 2.0 | 1.00 | 8 | 1,140 | 984 | 859 | 2.92 | N/A | N/A | 0.978 | N/A | 0.457 | N/A | N/A | NO |
| 10.50 | 1.0 | 1.00 | 7 | 1,260 | 1,042 | 917 | 3.04 | N/A | N/A | 0.976 | N/A | 0.476 | N/A | N/A | NO |
| 11.50 | 0.0 | 1.00 | 7 | 1,380 | 1,099 | 974 | 3.05 | N/A | N/A | 0.973 | N/A | 0.492 | N/A | N/A | NO |
| 12.50 | -1.0 | 1.00 | 6 | 1,500 | 1,157 | 1,032 | 2.90 | N/A | N/A | 0.971 | N/A | 0.507 | N/A | N/A | NO |
| 13.50 | -2.0 | 1.00 | 6 | 1,620 | 1,214 | 1,090 | 2.88 | N/A | N/A | 0.969 | N/A | 0.521 | N/A | N/A | NO |
| 14.50 | -3.0 | 1.00 | 5 | 1,740 | 1,272 | 1,147 | 2.94 | N/A | N/A | 0.966 | N/A | 0.533 | N/A | N/A | NO |
| 15.50 | -4.0 | 1.00 | 9 | 1,860 | 1,330 | 1,205 | 2.61 | N/A | N/A | 0.964 | N/A | 0.543 | N/A | N/A | NO |
| 16.50 | -5.0 | 1.00 | 7 | 1,980 | 1,387 | 1,262 | 2.72 | N/A | N/A | 0.962 | N/A | 0.553 | N/A | N/A | NO |
| 17.50 | -6.0 | 1.00 | 7 | 2,100 | 1,445 | 1,320 | 2.80 | N/A | N/A | 0.959 | N/A | 0.562 | N/A | N/A | NO |
| 18.50 | -7.0 | 1.00 | 7 | 2,220 | 1,502 | 1,378 | 2.89 | N/A | N/A | 0.957 | N/A | 0.570 | N/A | N/A | NO |
| 19.50 | -8.0 | 1.00 | 11 | 2,340 | 1,560 | 1,435 | 3.00 | N/A | N/A | 0.955 | N/A | 0.577 | N/A | N/A | NO |
| 20.50 | -9.0 | 1.00 | 10 | 2,460 | 1,618 | 1,493 | 2.88 | N/A | N/A | 0.952 | N/A | 0.584 | N/A | N/A | NO |
| 21.50 | -10.0 | 1.00 | 16 | 2,580 | 1,675 | 1,550 | 2.60 | N/A | N/A | 0.950 | N/A | 0.590 | N/A | N/A | NO |
| 22.50 | -11.0 | 1.00 | 25 | 2,700 | 1,733 | 1,608 | 2.63 | N/A | N/A | 0.948 | N/A | 0.595 | N/A | N/A | NO |
| 23.50 | -12.0 | 1.00 | 17 | 2,820 | 1,790 | 1,666 | 2.77 | N/A | N/A | 0.945 | N/A | 0.600 | N/A | N/A | NO |
| 24.50 | -13.0 | 1.00 | 8 | 2,940 | 1,848 | 1,723 | 2.81 | N/A | N/A | 0.943 | N/A | 0.605 | N/A | N/A | NO |
| 25.50 | -14.0 | 1.00 | 8 | 3,060 | 1,906 | 1,781 | 2.73 | N/A | N/A | 0.941 | N/A | 0.609 | N/A | N/A | NO |
| 26.50 | -15.0 | 1.00 | 10 | 3,180 | 1,963 | 1,838 | 2.62 | N/A | N/A | 0.938 | N/A | 0.612 | N/A | N/A | NO |
| 27.50 | -16.0 | 1.00 | 14 | 3,300 | 2,021 | 1,896 | 2.28 | 1.87 | 79.27 | 0.936 | 0.997 | 0.616 | 0.126 | 0.263 | YES |
| 28.50 | -17.0 | 1.00 | 44 | 3,420 | 2,078 | 1,954 | 1.35 | 1.00 | 260.20 | 0.934 | 0.985 | 0.619 | N/A | N/A | NO |
| 29.50 | -18.0 | 1.00 | 79 | 3,540 | 2,136 | 2,011 | 1.08 | 1.00 | 460.21 | 0.931 | 0.974 | 0.622 | N/A | N/A | NO |

| Soil Depth During Test (ft) | RESIDUAL STRENGTH * SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | GROUND SETTLEMENT ** Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
|---|---|---|---|---|---|---|---|---|
| 0.50 | N/A | N/A | N/A | 28.0 | N/A | N/A | N/A | 0.17 |
| 1.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 2.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 3.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 4.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 5.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 6.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 7.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 8.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 9.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 10.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 11.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 12.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 13.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 14.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 15.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 16.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 17.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 18.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 19.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 20.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 21.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 22.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 23.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 24.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 25.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 26.50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.17 |
| 27.50 | 2.8 | 17.4 | 912 | 22.5 | N/A | 1.375 | 0.17 | 0.00 |
| 28.50 | N/A | N/A | N/A | 44.7 | N/A | 0.000 | 0.00 | 0.00 |
| 29.50 | N/A | N/A | N/A | 79.0 | N/A | 0.000 | 0.00 | 0.00 |

max= 912
min= 912
avg= 912

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-12 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 14.00 ft |
| GWT Elev. During Test | -1.00 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v$/$\sigma_v$') $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 15.00 ft below ground surface |
| GWT Depth For Design, Zwd = | 9.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 3.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.34 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.05 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.39 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 49.63 | 0.89 | 1.79 | silty sand to sandy silt | 13.0 | 1.66 | 27 | 60 | 60 | 60 | 1.48 | 1.00 | 474.46 | 0.999 | N/A | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | 60.9 | 0.032 | 0.000 | 0.00 | 0.39 |
| 1.50 | 23.03 | 0.78 | 3.37 | clayey silt to silty clay | 12.0 | 1.00 | 12 | 180 | 180 | 180 | 2.36 | 2.16 | 165.78 | 0.997 | N/A | 0.402 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.39 |
| 2.50 | 49.13 | 0.84 | 1.71 | silty sand to sandy silt | 11.0 | 1.00 | 16 | 300 | 300 | 300 | 2.00 | 1.30 | 164.33 | 0.994 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 38.4 | 0.082 | 0.065 | 0.01 | 0.38 |
| 3.50 | 69.33 | 0.57 | 0.83 | sand to silty sand | 10.0 | 1.00 | 17 | 420 | 420 | 420 | 1.72 | 1.05 | 159.13 | 0.992 | N/A | 0.400 | N/A | N/A | NO | N/A | N/A | N/A | 33.4 | 0.101 | 0.094 | 0.01 | 0.37 |
| 4.50 | 44.70 | 0.53 | 1.19 | silty sand to sandy silt | 9.0 | 1.00 | 15 | 540 | 540 | 540 | 2.01 | 1.31 | 113.11 | 0.990 | N/A | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 35.4 | 0.112 | 0.097 | 0.01 | 0.36 |
| 5.50 | 37.38 | 0.37 | 1.00 | silty sand to sandy silt | 8.0 | 1.00 | 12 | 660 | 660 | 660 | 2.06 | 1.39 | 90.14 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 30.4 | 0.129 | 0.134 | 0.02 | 0.34 |
| 6.50 | 41.75 | 0.32 | 0.77 | silty sand to sandy silt | 7.0 | 1.66 | 23 | 780 | 780 | 780 | 1.68 | 1.00 | 110.69 | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | 49.3 | 0.118 | 0.000 | 0.00 | 0.34 |
| 7.50 | 6.92 | 0.16 | 2.26 | silty clay to clay | 6.0 | 1.00 | 5 | 900 | 900 | 900 | 2.86 | N/A | N/A | 0.983 | N/A | 0.396 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 8.50 | 8.77 | 0.37 | 4.18 | clay | 5.0 | 1.00 | 9 | 1,020 | 1,020 | 1,020 | 2.97 | N/A | N/A | 0.980 | N/A | 0.395 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 9.50 | 17.98 | 0.99 | 5.50 | clay | 4.0 | 1.00 | 18 | 1,140 | 1,109 | 1,140 | 2.83 | N/A | N/A | 0.978 | N/A | 0.405 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 10.50 | 14.50 | 0.71 | 4.90 | clay | 3.0 | 1.00 | 15 | 1,260 | 1,166 | 1,260 | 2.88 | N/A | N/A | 0.976 | N/A | 0.425 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 11.50 | 7.60 | 0.38 | 4.95 | clay | 2.0 | 1.00 | 8 | 1,380 | 1,224 | 1,380 | 3.12 | N/A | N/A | 0.973 | N/A | 0.442 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 12.50 | 5.88 | 0.24 | 4.10 | clay | 1.0 | 1.00 | 6 | 1,500 | 1,282 | 1,500 | 3.18 | N/A | N/A | 0.971 | N/A | 0.458 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 13.50 | 5.18 | 0.17 | 3.28 | clay | 0.0 | 1.00 | 5 | 1,620 | 1,339 | 1,620 | 3.19 | N/A | N/A | 0.969 | N/A | 0.472 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 14.50 | 8.02 | 0.23 | 2.85 | silty clay to clay | -1.0 | 1.00 | 5 | 1,740 | 1,397 | 1,740 | 2.99 | N/A | N/A | 0.966 | N/A | 0.485 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 15.50 | 12.27 | 0.33 | 2.68 | clayey silt to silty clay | -2.0 | 1.00 | 6 | 1,860 | 1,454 | 1,829 | 2.83 | N/A | N/A | 0.964 | N/A | 0.497 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 16.50 | 9.08 | 0.25 | 2.75 | silty clay to clay | -3.0 | 1.00 | 6 | 1,980 | 1,512 | 1,886 | 2.96 | N/A | N/A | 0.962 | N/A | 0.507 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 17.50 | 10.70 | 0.26 | 2.38 | clayey silt to silty clay | -4.0 | 1.00 | 5 | 2,100 | 1,570 | 1,944 | 2.88 | N/A | N/A | 0.959 | N/A | 0.517 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 18.50 | 9.17 | 0.16 | 1.73 | clayey silt to silty clay | -5.0 | 1.00 | 5 | 2,220 | 1,627 | 2,002 | 2.87 | N/A | N/A | 0.957 | N/A | 0.526 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 19.50 | 13.00 | 0.33 | 2.50 | clayey silt to silty clay | -6.0 | 1.00 | 7 | 2,340 | 1,685 | 2,059 | 2.84 | N/A | N/A | 0.955 | N/A | 0.534 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 20.50 | 12.36 | 0.46 | 3.75 | clay | -7.0 | 1.00 | 12 | 2,460 | 1,742 | 2,117 | 2.97 | N/A | N/A | 0.952 | N/A | 0.542 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 21.50 | 17.52 | 0.74 | 4.22 | clay | -8.0 | 1.00 | 18 | 2,580 | 1,800 | 2,174 | 2.89 | N/A | N/A | 0.950 | N/A | 0.549 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 22.50 | 20.67 | 0.66 | 3.19 | clayey silt to silty clay | -9.0 | 1.00 | 10 | 2,700 | 1,858 | 2,232 | 2.76 | N/A | N/A | 0.948 | N/A | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 23.50 | 20.18 | 0.54 | 2.65 | clayey silt to silty clay | -10.0 | 1.00 | 10 | 2,820 | 1,915 | 2,290 | 2.73 | N/A | N/A | 0.945 | N/A | 0.561 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 24.50 | 21.77 | 0.68 | 3.14 | clayey silt to silty clay | -11.0 | 1.00 | 11 | 2,940 | 1,973 | 2,347 | 2.75 | N/A | N/A | 0.943 | N/A | 0.566 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 25.50 | 20.32 | 0.75 | 3.69 | silty clay to clay | -12.0 | 1.00 | 14 | 3,060 | 2,030 | 2,405 | 2.83 | N/A | N/A | 0.941 | N/A | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 26.50 | 22.40 | 0.69 | 3.08 | clayey silt to silty clay | -13.0 | 1.00 | 11 | 3,180 | 2,088 | 2,462 | 2.75 | N/A | N/A | 0.938 | N/A | 0.576 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.34 |
| 27.50 | 93.25 | 1.08 | 1.16 | sand to silty sand | -14.0 | 1.00 | 23 | 3,300 | 2,146 | 2,520 | 1.99 | 1.29 | 115.94 | 0.936 | 0.976 | 0.580 | 0.225 | 0.486 | YES | 1.3 | 22.1 | 1,200 | 24.3 | N/A | 1.244 | 0.15 | 0.19 |
| 28.50 | 121.28 | 1.17 | 0.96 | sand to silty sand | -15.0 | 1.00 | 30 | 3,420 | 2,203 | 2,578 | 1.86 | 1.15 | 132.84 | 0.934 | 0.963 | 0.584 | 0.298 | 0.631 | YES | 1.3 | 28.0 | 1,200 | 30.5 | N/A | 0.632 | 0.08 | 0.12 |
| 29.50 | 213.15 | 0.97 | 0.46 | sand | -16.0 | 1.00 | 43 | 3,540 | 2,261 | 2,635 | 1.46 | 1.00 | 200.48 | 0.931 | 0.952 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 37.1 | N/A | 0.048 | 0.01 | 0.11 |
| 30.50 | 350.87 | 1.63 | 0.46 | gravelly sand to sand | -17.0 | 1.00 | 58 | 3,660 | 2,318 | 2,693 | 1.31 | 1.00 | 325.88 | 0.926 | 0.943 | 0.589 | N/A | N/A | NO | N/A | N/A | N/A | 50.4 | N/A | 0.000 | 0.00 | 0.11 |
| 31.50 | 493.11 | 3.09 | 0.63 | gravelly sand to sand | -18.0 | 1.00 | 82 | 3,780 | 2,376 | 2,750 | 1.30 | 1.00 | 452.42 | 0.918 | 0.933 | 0.588 | N/A | N/A | NO | N/A | N/A | N/A | 70.1 | N/A | 0.000 | 0.00 | 0.11 |
| 32.50 | 558.93 | 2.88 | 0.52 | gravelly sand to sand | -19.0 | 1.00 | 93 | 3,900 | 2,434 | 2,808 | 1.21 | 1.00 | 506.70 | 0.909 | 0.925 | 0.587 | N/A | N/A | NO | N/A | N/A | N/A | 78.6 | N/A | 0.000 | 0.00 | 0.11 |
| 33.50 | 575.72 | 3.33 | 0.58 | gravelly sand to sand | -20.0 | 1.00 | 96 | 4,020 | 2,491 | 2,866 | 1.24 | 1.00 | 515.85 | 0.901 | 0.916 | 0.586 | N/A | N/A | NO | N/A | N/A | N/A | 80.2 | N/A | 0.000 | 0.00 | 0.11 |
| 34.50 | 413.05 | 2.28 | 0.55 | gravelly sand to sand | -21.0 | 1.66 | 114 | 4,140 | 2,549 | 2,923 | 1.01 | 1.00 | 605.82 | 0.893 | 0.908 | 0.585 | N/A | N/A | NO | N/A | N/A | N/A | 94.3 | N/A | 0.000 | 0.00 | 0.11 |
| 35.50 | 172.18 | 0.86 | 0.50 | sand | -22.0 | 1.00 | 34 | 4,260 | 2,606 | 2,981 | 1.59 | 1.00 | 150.83 | 0.885 | 0.900 | 0.583 | 0.399 | 0.791 | YES | 0.0 | 28.2 | 1,200 | 28.2 | N/A | 0.927 | 0.11 | 0.00 |
| 36.50 | 274.98 | 1.61 | 0.59 | sand | -23.0 | 1.00 | 55 | 4,380 | 2,664 | 3,038 | 1.48 | 1.00 | 238.26 | 0.877 | 0.892 | 0.581 | N/A | N/A | NO | N/A | N/A | N/A | 44.6 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 462.32 | 2.42 | 0.52 | gravelly sand to sand | -24.0 | 1.00 | 77 | 4,500 | 2,722 | 3,096 | 1.28 | 1.00 | 396.32 | 0.869 | 0.884 | 0.579 | N/A | N/A | NO | N/A | N/A | N/A | 61.9 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 329.55 | 1.37 | 0.42 | gravelly sand to sand | -25.0 | 1.00 | 55 | 4,620 | 2,779 | 3,154 | 1.33 | 1.00 | 279.56 | 0.861 | 0.877 | 0.577 | N/A | N/A | NO | N/A | N/A | N/A | 43.7 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 355.45 | 1.37 | 0.39 | gravelly sand to sand | -26.0 | 1.00 | 59 | 4,740 | 2,837 | 3,211 | 1.28 | 1.00 | 298.46 | 0.852 | 0.870 | 0.574 | N/A | N/A | NO | N/A | N/A | N/A | 46.8 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 436.57 | 2.41 | 0.55 | gravelly sand to sand | -27.0 | 1.00 | 73 | 4,860 | 2,894 | 3,269 | 1.33 | 1.00 | 362.90 | 0.844 | 0.863 | 0.571 | N/A | N/A | NO | N/A | N/A | N/A | 56.9 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 1,200 |
| avg= | 1,200 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-13 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 13.00 ft |
| GWT Elev. During Test | -0.10 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

\+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$

+++ FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_{\alpha \to >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 13.10 ft below ground surface |
| GWT Depth For Design, Zwd = | 8.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 5.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 1.03 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.02 inches | <--- Dry or Unsaturated Sands |
| Total: | 1.05 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 0.50 | 28.95 | 0.47 | 1.61 | sandy silt to clayey silt | 12.0 | 1.00 | 12 | 60 | 60 | 60 | 1.89 | 1.18 | 197.84 | 0.999 | N/A | 0.403 | N/A | N/A | NO | N/A | N/A | N/A | 28.6 | N/A | N/A | N/A | 1.05 |
| 1.50 | 51.27 | 0.31 | 0.61 | sand to silty sand | 11.0 | 1.00 | 13 | 180 | 180 | 180 | 1.59 | 1.00 | 170.89 | 0.997 | N/A | 0.402 | N/A | N/A | NO | N/A | N/A | N/A | 25.3 | 0.074 | 0.096 | 0.01 | 1.04 |
| 2.50 | 100.75 | 0.47 | 0.47 | sand | 10.0 | 1.00 | 20 | 300 | 300 | 300 | 1.38 | 1.00 | 260.14 | 0.994 | N/A | 0.401 | N/A | N/A | NO | N/A | N/A | N/A | 34.3 | 0.086 | 0.077 | 0.01 | 1.03 |
| 3.50 | 120.30 | 0.62 | 0.51 | sand | 9.0 | 1.00 | 24 | 420 | 420 | 420 | 1.40 | 1.00 | 262.52 | 0.992 | N/A | 0.400 | N/A | N/A | NO | N/A | N/A | N/A | 40.9 | 0.095 | 0.000 | 0.00 | 1.03 |
| 4.50 | 66.72 | 0.49 | 0.73 | sand to silty sand | 8.0 | 1.66 | 28 | 540 | 540 | 540 | 1.43 | 1.00 | 212.59 | 0.990 | N/A | 0.399 | N/A | N/A | NO | N/A | N/A | N/A | 51.7 | 0.098 | 0.000 | 0.00 | 1.03 |
| 5.50 | 22.08 | 0.23 | 1.02 | sandy silt to clayey silt | 7.0 | 1.66 | 15 | 660 | 660 | 660 | 1.95 | 1.24 | 78.92 | 0.987 | N/A | 0.398 | N/A | N/A | NO | N/A | N/A | N/A | 34.8 | N/A | N/A | N/A | 1.03 |
| 6.50 | 8.15 | 0.10 | 1.26 | clayey silt to silty clay | 6.0 | 1.00 | 4 | 780 | 780 | 780 | 2.62 | N/A | N/A | 0.985 | N/A | 0.397 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 7.50 | 16.80 | 0.64 | 3.82 | silty clay to clay | 5.0 | 1.00 | 11 | 900 | 900 | 900 | 2.69 | N/A | N/A | 0.983 | N/A | 0.396 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 8.50 | 18.45 | 0.69 | 3.74 | silty clay to clay | 4.0 | 1.00 | 12 | 1,020 | 989 | 1,020 | 2.68 | N/A | N/A | 0.980 | N/A | 0.407 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 9.50 | 13.65 | 0.40 | 2.94 | clayey silt to silty clay | 3.0 | 1.00 | 7 | 1,140 | 1,046 | 1,140 | 2.73 | N/A | N/A | 0.978 | N/A | 0.429 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 10.50 | 8.40 | 0.28 | 3.31 | clay | 2.0 | 1.00 | 8 | 1,260 | 1,104 | 1,260 | 2.95 | N/A | N/A | 0.976 | N/A | 0.449 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 11.50 | 6.43 | 0.25 | 3.78 | clay | 1.0 | 1.00 | 6 | 1,380 | 1,162 | 1,380 | 3.10 | N/A | N/A | 0.973 | N/A | 0.466 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 12.50 | 6.98 | 0.17 | 2.38 | silty clay to clay | 0.0 | 1.00 | 5 | 1,500 | 1,219 | 1,500 | 2.96 | N/A | N/A | 0.971 | N/A | 0.481 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 13.50 | 11.10 | 0.26 | 2.34 | clayey silt to silty clay | -1.0 | 1.00 | 6 | 1,620 | 1,277 | 1,595 | 2.80 | N/A | N/A | 0.969 | N/A | 0.495 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 14.50 | 12.32 | 0.29 | 2.37 | clayey silt to silty clay | -2.0 | 1.00 | 6 | 1,740 | 1,334 | 1,653 | 2.77 | N/A | N/A | 0.966 | N/A | 0.508 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 15.50 | 10.13 | 0.19 | 1.89 | clayey silt to silty clay | -3.0 | 1.00 | 5 | 1,860 | 1,392 | 1,710 | 2.81 | N/A | N/A | 0.964 | N/A | 0.519 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 16.50 | 9.13 | 0.15 | 1.59 | clayey silt to silty clay | -4.0 | 1.00 | 5 | 1,980 | 1,450 | 1,768 | 2.82 | N/A | N/A | 0.962 | N/A | 0.529 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 17.50 | 13.40 | 0.26 | 1.93 | clayey silt to silty clay | -5.0 | 1.00 | 7 | 2,100 | 1,507 | 1,825 | 2.73 | N/A | N/A | 0.959 | N/A | 0.539 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.03 |
| 18.50 | 16.75 | 0.21 | 1.25 | sandy silt to clayey silt | -6.0 | 1.00 | 7 | 2,220 | 1,565 | 1,883 | 2.55 | 3.04 | 61.23 | 0.957 | 1.000 | 0.547 | 0.101 | 0.238 | YES | 2.8 | 9.7 | 296 | 13.3 | N/A | 2.087 | 0.25 | 0.78 |
| 19.50 | 12.20 | 0.31 | 2.51 | clayey silt to silty clay | -7.0 | 1.00 | 6 | 2,340 | 1,622 | 1,941 | 2.85 | N/A | N/A | 0.955 | N/A | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.78 |
| 20.50 | 12.97 | 0.41 | 3.15 | silty clay to clay | -8.0 | 1.00 | 9 | 2,460 | 1,680 | 1,998 | 2.90 | N/A | N/A | 0.952 | N/A | 0.562 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.78 |
| 21.50 | 14.03 | 0.52 | 3.70 | silty clay to clay | -9.0 | 1.00 | 9 | 2,580 | 1,738 | 2,056 | 2.92 | N/A | N/A | 0.950 | N/A | 0.568 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.78 |
| 22.50 | 25.75 | 0.63 | 2.43 | sandy silt to clayey silt | -10.0 | 1.00 | 10 | 2,700 | 1,795 | 2,113 | 2.60 | 3.32 | 92.67 | 0.948 | 1.000 | 0.574 | 0.154 | 0.344 | YES | 2.8 | 12.8 | 496 | 17.0 | N/A | 1.769 | 0.21 | 0.57 |
| 23.50 | 28.73 | 0.96 | 3.35 | clayey silt to silty clay | -11.0 | 1.00 | 14 | 2,820 | 1,853 | 2,171 | 2.66 | N/A | N/A | 0.945 | N/A | 0.580 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.57 |
| 24.50 | 21.55 | 0.75 | 3.45 | clayey silt to silty clay | -12.0 | 1.00 | 11 | 2,940 | 1,910 | 2,229 | 2.78 | N/A | N/A | 0.943 | N/A | 0.585 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.57 |
| 25.50 | 19.35 | 0.50 | 2.57 | clayey silt to silty clay | -13.0 | 1.00 | 10 | 3,060 | 1,968 | 2,286 | 2.74 | N/A | N/A | 0.941 | N/A | 0.589 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.57 |
| 26.50 | 36.03 | 0.88 | 2.42 | sandy silt to clayey silt | -14.0 | 1.00 | 14 | 3,180 | 2,026 | 2,344 | 2.51 | 2.83 | 101.38 | 0.938 | 0.997 | 0.594 | 0.177 | 0.382 | YES | 2.8 | 16.1 | 785 | 21.0 | N/A | 1.484 | 0.18 | 0.39 |
| 27.50 | 56.90 | 0.52 | 0.92 | sand to silty sand | -15.0 | 1.00 | 14 | 3,300 | 2,083 | 2,401 | 2.10 | 1.45 | 80.92 | 0.936 | 0.989 | 0.597 | 0.129 | 0.275 | YES | 1.3 | 14.3 | 619 | 16.1 | N/A | 1.837 | 0.22 | 0.17 |
| 28.50 | 123.22 | 0.93 | 0.75 | sand | -16.0 | 1.00 | 25 | 3,420 | 2,141 | 2,459 | 1.78 | 1.09 | 129.90 | 0.934 | 0.976 | 0.601 | 0.284 | 0.592 | YES | 0.0 | 22.2 | 1,200 | 22.2 | N/A | 1.395 | 0.17 | 0.00 |
| 29.50 | 476.62 | 2.55 | 0.53 | gravelly sand to sand | -17.0 | 1.00 | 79 | 3,540 | 2,198 | 2,517 | 1.25 | 1.00 | 454.60 | 0.931 | 0.963 | 0.604 | N/A | N/A | NO | N/A | N/A | N/A | 70.8 | N/A | 0.000 | 0.00 | 0.00 |
| 30.50 | 544.30 | 2.40 | 0.44 | gravelly sand to sand | -18.0 | 1.00 | 91 | 3,660 | 2,256 | 2,574 | 1.15 | 1.00 | 512.49 | 0.926 | 0.953 | 0.605 | N/A | N/A | NO | N/A | N/A | N/A | 80.0 | N/A | 0.000 | 0.00 | 0.00 |
| 31.50 | 495.04 | 2.44 | 0.49 | gravelly sand to sand | -19.0 | 1.00 | 83 | 3,780 | 2,314 | 2,632 | 1.22 | 1.00 | 460.27 | 0.918 | 0.943 | 0.604 | N/A | N/A | NO | N/A | N/A | N/A | 71.9 | N/A | 0.000 | 0.00 | 0.00 |
| 32.50 | 342.78 | 1.00 | 0.29 | gravelly sand to sand | -20.0 | 1.00 | 57 | 3,900 | 2,371 | 2,689 | 1.19 | 1.00 | 314.81 | 0.909 | 0.934 | 0.603 | N/A | N/A | NO | N/A | N/A | N/A | 49.3 | N/A | 0.000 | 0.00 | 0.00 |
| 33.50 | 422.53 | 1.97 | 0.47 | gravelly sand to sand | -21.0 | 1.00 | 70 | 4,020 | 2,429 | 2,747 | 1.26 | 1.00 | 383.42 | 0.901 | 0.925 | 0.601 | N/A | N/A | NO | N/A | N/A | N/A | 60.1 | N/A | 0.000 | 0.00 | 0.00 |
| 34.50 | 342.05 | 2.11 | 0.62 | gravelly sand to sand | -22.0 | 1.00 | 57 | 4,140 | 2,486 | 2,805 | 1.41 | 1.00 | 306.77 | 0.893 | 0.917 | 0.599 | N/A | N/A | NO | N/A | N/A | N/A | 48.1 | N/A | 0.000 | 0.00 | 0.00 |
| 35.50 | 366.27 | 1.41 | 0.39 | gravelly sand to sand | -23.0 | 1.00 | 61 | 4,260 | 2,544 | 2,862 | 1.25 | 1.00 | 324.75 | 0.885 | 0.908 | 0.597 | N/A | N/A | NO | N/A | N/A | N/A | 51.0 | N/A | 0.000 | 0.00 | 0.00 |
| 36.50 | 596.02 | 3.61 | 0.61 | gravelly sand to sand | -24.0 | 1.00 | 99 | 4,380 | 2,602 | 2,920 | 1.25 | 1.00 | 522.58 | 0.877 | 0.900 | 0.595 | N/A | N/A | NO | N/A | N/A | N/A | 82.2 | N/A | 0.000 | 0.00 | 0.00 |
| 37.50 | 694.00 | 5.20 | 0.75 | gravelly sand to sand | -25.0 | 1.00 | 116 | 4,500 | 2,659 | 2,977 | 1.30 | 1.00 | 601.86 | 0.869 | 0.892 | 0.592 | N/A | N/A | NO | N/A | N/A | N/A | 94.8 | N/A | 0.000 | 0.00 | 0.00 |
| 38.50 | 588.15 | 3.87 | 0.66 | gravelly sand to sand | -26.0 | 1.00 | 98 | 4,620 | 2,717 | 3,035 | 1.29 | 1.00 | 504.63 | 0.861 | 0.885 | 0.590 | N/A | N/A | NO | N/A | N/A | N/A | 79.6 | N/A | 0.000 | 0.00 | 0.00 |
| 39.50 | 422.48 | 1.41 | 0.33 | gravelly sand to sand | -27.0 | 1.00 | 70 | 4,740 | 2,774 | 3,093 | 1.18 | 1.00 | 358.71 | 0.852 | 0.877 | 0.587 | N/A | N/A | NO | N/A | N/A | N/A | 56.6 | N/A | 0.000 | 0.00 | 0.00 |
| 40.50 | 384.95 | 1.29 | 0.34 | gravelly sand to sand | -28.0 | 1.00 | 64 | 4,860 | 2,832 | 3,150 | 1.22 | 1.00 | 323.50 | 0.844 | 0.870 | 0.584 | N/A | N/A | NO | N/A | N/A | N/A | 51.1 | N/A | 0.000 | 0.00 | 0.00 |
| 41.50 | 349.96 | 2.54 | 0.72 | gravelly sand to sand | -29.0 | 1.00 | 58 | 4,980 | 2,890 | 3,208 | 1.48 | 1.00 | 291.15 | 0.836 | 0.863 | 0.581 | N/A | N/A | NO | N/A | N/A | N/A | 46.1 | N/A | 0.000 | 0.00 | 0.00 |
| 42.50 | 389.30 | 2.01 | 0.52 | gravelly sand to sand | -30.0 | 1.00 | 65 | 5,100 | 2,947 | 3,265 | 1.34 | 1.00 | 320.70 | 0.828 | 0.856 | 0.577 | N/A | N/A | NO | N/A | N/A | N/A | 50.8 | N/A | 0.000 | 0.00 | 0.00 |
| 43.50 | 451.33 | 2.39 | 0.53 | gravelly sand to sand | -31.0 | 1.00 | 75 | 5,220 | 3,005 | 3,323 | 1.31 | 1.00 | 368.22 | 0.820 | 0.850 | 0.574 | N/A | N/A | NO | N/A | N/A | N/A | 58.4 | N/A | 0.000 | 0.00 | 0.00 |
| 44.50 | 435.12 | 1.87 | 0.43 | gravelly sand to sand | -32.0 | 1.00 | 73 | 5,340 | 3,062 | 3,381 | 1.26 | 1.00 | 351.64 | 0.812 | 0.843 | 0.570 | N/A | N/A | NO | N/A | N/A | N/A | 55.8 | N/A | 0.000 | 0.00 | 0.00 |
| 45.50 | 425.65 | 2.37 | 0.56 | gravelly sand to sand | -33.0 | 1.00 | 71 | 5,460 | 3,120 | 3,438 | 1.35 | 1.00 | 340.80 | 0.804 | 0.837 | 0.567 | N/A | N/A | NO | N/A | N/A | N/A | 54.1 | N/A | 0.000 | 0.00 | 0.00 |
| 46.50 | 375.28 | 2.80 | 0.75 | gravelly sand to sand | -34.0 | 1.00 | 63 | 5,580 | 3,178 | 3,496 | 1.48 | 1.00 | 297.73 | 0.795 | 0.831 | 0.563 | N/A | N/A | NO | N/A | N/A | N/A | 47.3 | N/A | 0.000 | 0.00 | 0.00 |
| 47.50 | 421.02 | 2.83 | 0.67 | gravelly sand to sand | -35.0 | 1.00 | 70 | 5,700 | 3,235 | 3,553 | 1.42 | 1.00 | 331.03 | 0.787 | 0.825 | 0.559 | N/A | N/A | NO | N/A | N/A | N/A | 52.6 | N/A | 0.000 | 0.00 | 0.00 |
| 48.50 | 408.48 | 2.95 | 0.72 | gravelly sand to sand | -36.0 | 1.00 | 68 | 5,820 | 3,293 | 3,611 | 1.45 | 1.00 | 318.35 | 0.779 | 0.819 | 0.555 | N/A | N/A | NO | N/A | N/A | N/A | 50.7 | N/A | 0.000 | 0.00 | 0.00 |
| 49.50 | 445.62 | 2.75 | 0.62 | gravelly sand to sand | -37.0 | 1.00 | 74 | 5,940 | 3,350 | 3,669 | 1.38 | 1.00 | 344.30 | 0.771 | 0.814 | 0.551 | N/A | N/A | NO | N/A | N/A | N/A | 54.8 | N/A | 0.000 | 0.00 | 0.00 |
| 50.50 | 328.55 | 2.39 | 0.73 | gravelly sand to sand | -38.0 | 1.00 | 55 | 6,060 | 3,408 | 3,726 | 1.52 | 1.00 | 251.69 | 0.763 | 0.808 | 0.547 | N/A | N/A | NO | N/A | N/A | N/A | 40.1 | N/A | 0.000 | 0.00 | 0.00 |
| 51.50 | 363.18 | 2.54 | 0.70 | gravelly sand to sand | -39.0 | 1.00 | 61 | 6,180 | 3,466 | 3,784 | 1.48 | 1.00 | 275.90 | 0.755 | 0.803 | 0.542 | N/A | N/A | NO | N/A | N/A | N/A | 44.0 | N/A | 0.000 | 0.00 | 0.00 |
| 52.50 | 422.44 | 3.30 | 0.78 | gravelly sand to sand | -40.0 | 1.00 | 70 | 6,300 | 3,523 | 3,841 | 1.48 | 1.00 | 318.29 | 0.747 | 0.797 | 0.538 | N/A | N/A | NO | N/A | N/A | N/A | 50.8 | N/A | 0.000 | 0.00 | 0.00 |
| 53.50 | 399.95 | 3.49 | 0.87 | sand | -41.0 | 1.00 | 80 | 6,420 | 3,581 | 3,899 | 1.53 | 1.00 | 298.91 | 0.739 | 0.792 | 0.534 | N/A | N/A | NO | N/A | N/A | N/A | 57.3 | N/A | 0.000 | 0.00 | 0.00 |
| 54.50 | 365.12 | 4.03 | 1.10 | sand | -42.0 | 1.00 | 73 | 6,540 | 3,638 | 3,957 | 1.64 | 1.00 | 270.70 | 0.730 | 0.787 | 0.529 | N/A | N/A | NO | N/A | N/A | N/A | 51.9 | N/A | 0.000 | 0.00 | 0.00 |
| 55.50 | 387.10 | 3.94 | 1.02 | sand | -43.0 | 1.00 | 77 | 6,660 | 3,696 | 4,014 | 1.60 | 1.00 | 284.76 | 0.722 | 0.782 | 0.524 | N/A | N/A | NO | N/A | N/A | N/A | 54.6 | N/A | 0.000 | 0.00 | 0.00 |
| 56.50 | 506.82 | 3.42 | 0.67 | gravelly sand to sand | -44.0 | 1.00 | 84 | 6,780 | 3,754 | 4,072 | 1.39 | 1.00 | 369.95 | 0.714 | 0.777 | 0.520 | N/A | N/A | NO | N/A | N/A | N/A | 59.2 | N/A | 0.000 | 0.00 | 0.00 |
| 57.50 | 557.47 | 3.38 | 0.61 | gravelly sand to sand | -45.0 | 1.00 | 93 | 6,900 | 3,811 | 4,129 | 1.33 | 1.00 | 403.84 | 0.706 | 0.773 | 0.515 | N/A | N/A | NO | N/A | N/A | N/A | 64.7 | N/A | 0.000 | 0.00 | 0.00 |
| 58.50 | 456.07 | 4.26 | 0.93 | sand | -46.0 | 1.00 | 91 | 7,020 | 3,869 | 4,187 | 1.53 | 1.00 | 327.91 | 0.698 | 0.768 | 0.510 | N/A | N/A | NO | N/A | N/A | N/A | 63.0 | N/A | 0.000 | 0.00 | 0.00 |
| 59.50 | 383.92 | 4.97 | 1.29 | sand | -47.0 | 1.00 | 77 | 7,140 | 3,926 | 4,245 | 1.69 | 1.03 | 282.23 | 0.690 | 0.764 | 0.505 | N/A | N/A | NO | N/A | N/A | N/A | 52.7 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 296 |
| avg= | 679 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED SETTLEMENTS USING CPT DATA (METHOD 2)

**(Engineer: Curt Scheyhing)**

| PROJECT INFORMATION | |
|---|---|
| Project Name | Marina Del Mar - Parcel 44 |
| Project No. | LA-1049 |
| Location | Los Angeles |
| Exploration No. | CPT-12-14 |

| GENERAL INPUT DATA | |
|---|---|
| Ground Surf. Elev. During Test | 10.00 ft |
| GWT Elev. During Test | 2.50 ft |
| GWT Elev. For Design | 5.00 ft |
| Total Soil Unit Weight, $\gamma_t$ | 120.00 pcf |
| Earthquake Magnitude, $M_{eq}$ | 6.80 |
| Peak Ground Acceleration, $A_{max}$ | 0.62 g |
| Required Factor of Safety | 1.30 |

**REFERENCES**

+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)

++ $CSR = 0.65\ A_{max}\ (\sigma_v/\sigma_v')\ r_d$

+++ $FS = (CRR_{7.5}/CSR)\ MSF\ K_\sigma\ K_{\alpha \rightarrow >>}$ where $CRR_{7.5}$ is evaluated from direct CPT data, $K_\alpha$ =1.0 and MSF = 1.28

* Residual strength values of liquefied soils are evaluated from converted SPT blow counts using the median curve by Seed & Harder (1990)

** Ground settlements are evaluated from converted SPT blow counts using the method developed by Tokimatsu and Seed (1987).

Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.

| | |
|---|---|
| GWT Depth During Test, Zw = | 7.50 ft below ground surface |
| GWT Depth For Design, Zwd = | 5.00 ft below ground surface |

***** SUMMARY OF RESULTS *****

| | | |
|---|---|---|
| Total Thickness of Liquefiable Soils = | 5.00 feet | |
| Earthquake-Induced Settlements: | | |
| - Liquefaction-Induced Settlement = | 0.66 inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 inches | <--- Dry or Unsaturated Sands |
| Total: | 0.66 inches | |

| INPUT SOIL PROFILE (CPT DATA) | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | | | RESIDUAL STRENGTH * | | | GROUND SETTLEMENT ** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth During Test (ft) | Average Cone Tip Resistance $q_{t-avg}$ (tsf) | Average Sleeve Friction $f_{s-avg}$ (tsf) | Average Friction Ratio $R_{f-avg}$ (%) | Soil Behavior Type (Robertson et al., 1983) | Bottom of Layer Elevation (ft) | Thin Layer Correction Factor (Lunne, et al., 1997) | Equiv. SPT Blow Count $N_{60}$(blows/ft) | Total Vert. Stress $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Test) $\sigma_{v'}$ (psf) | Soil Behavior Type Index $I_c$ | Fines Correction Factor $K_c$ | Corrected Tip Resistance $q_{c1Ncs}$ | Shear Stress Reduction Coeff. $r_d$ | Correction for High Overburden Stress $K_\sigma$ | Cyclic Stress Ratio ++ CSR | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction +++ FS | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Cyclic Shear Strain $\gamma_c$ (%) | Vol. Strain $\varepsilon_v$ (%) | Layer Settlement $S_i$ (in.) | Cumulative Settlement Profile (in.) |
| 5.50 | 11.37 | 0.30 | 2.63 | silty clay to clay | 4.0 | 1.00 | 8 | 660 | 629 | 660 | 2.62 | N/A | N/A | 0.987 | N/A | 0.418 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.66 |
| 6.50 | 9.67 | 0.50 | 5.09 | clay | 3.0 | 1.00 | 10 | 780 | 686 | 780 | 2.89 | N/A | N/A | 0.985 | N/A | 0.451 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.66 |
| 7.50 | 8.23 | 0.37 | 4.43 | clay | 2.0 | 1.00 | 8 | 900 | 744 | 900 | 2.93 | N/A | N/A | 0.983 | N/A | 0.479 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.66 |
| 8.50 | 7.20 | 0.15 | 2.11 | silty clay to clay | 1.0 | 1.00 | 5 | 1,020 | 802 | 958 | 2.80 | N/A | N/A | 0.980 | N/A | 0.503 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.66 |
| 9.50 | 9.10 | 0.17 | 1.90 | clayey silt to silty clay | 0.0 | 1.00 | 5 | 1,140 | 859 | 1,015 | 2.71 | N/A | N/A | 0.978 | N/A | 0.523 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.66 |
| 10.50 | 10.73 | 0.20 | 1.83 | clayey silt to silty clay | -1.0 | 1.00 | 5 | 1,260 | 917 | 1,073 | 2.66 | N/A | N/A | 0.976 | N/A | 0.540 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.66 |
| 11.50 | 20.52 | 0.38 | 1.85 | sandy silt to clayey silt | -2.0 | 1.00 | 8 | 1,380 | 974 | 1,130 | 2.50 | 2.78 | 81.81 | 0.973 | 1.000 | 0.555 | 0.131 | 0.303 | YES | 2.8 | 13.7 | 568 | 18.1 | N/A | 1.690 | 0.20 | 0.46 |
| 12.50 | 46.23 | 0.29 | 0.63 | sand to silty sand | -3.0 | 1.00 | 12 | 1,500 | 1,032 | 1,188 | 1.95 | 1.24 | 79.93 | 0.971 | 1.000 | 0.569 | 0.127 | 0.288 | YES | 1.3 | 16.3 | 806 | 18.2 | N/A | 1.682 | 0.20 | 0.25 |
| 13.50 | 42.83 | 0.41 | 0.96 | silty sand to sandy silt | -4.0 | 1.66 | 24 | 1,620 | 1,090 | 1,246 | 1.79 | 1.10 | 105.42 | 0.969 | 1.000 | 0.580 | 0.189 | 0.418 | YES | 2.8 | 32.8 | 1,200 | 40.9 | N/A | 0.000 | 0.00 | 0.25 |
| 14.50 | 13.08 | 0.31 | 2.36 | clayey silt to silty clay | -5.0 | 1.00 | 7 | 1,740 | 1,147 | 1,303 | 2.71 | N/A | N/A | 0.966 | N/A | 0.591 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 15.50 | 13.07 | 0.27 | 2.04 | clayey silt to silty clay | -6.0 | 1.00 | 7 | 1,860 | 1,205 | 1,361 | 2.69 | N/A | N/A | 0.964 | N/A | 0.600 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 16.50 | 13.17 | 0.28 | 2.13 | clayey silt to silty clay | -7.0 | 1.00 | 7 | 1,980 | 1,262 | 1,418 | 2.71 | N/A | N/A | 0.962 | N/A | 0.608 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.25 |
| 17.50 | 15.63 | 0.26 | 1.65 | sandy silt to clayey silt | -8.0 | 1.00 | 6 | 2,100 | 1,320 | 1,476 | 2.60 | 3.31 | 70.68 | 0.959 | 1.000 | 0.615 | 0.113 | 0.236 | YES | 2.8 | 10.1 | 316 | 13.7 | N/A | 2.018 | 0.24 | 0.01 |
| 18.50 | 11.22 | 0.40 | 3.51 | silty clay to clay | -9.0 | 1.00 | 7 | 2,220 | 1,378 | 1,534 | 2.93 | N/A | N/A | 0.957 | N/A | 0.621 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 19.50 | 13.82 | 0.45 | 3.22 | silty clay to clay | -10.0 | 1.00 | 9 | 2,340 | 1,435 | 1,591 | 2.84 | N/A | N/A | 0.955 | N/A | 0.627 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 20.50 | 22.64 | 0.76 | 3.34 | clayey silt to silty clay | -11.0 | 1.00 | 11 | 2,460 | 1,493 | 1,649 | 2.69 | N/A | N/A | 0.952 | N/A | 0.632 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 21.50 | 19.33 | 0.65 | 3.36 | clayey silt to silty clay | -12.0 | 1.00 | 10 | 2,580 | 1,550 | 1,706 | 2.75 | N/A | N/A | 0.950 | N/A | 0.637 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 22.50 | 19.52 | 0.54 | 2.76 | clayey silt to silty clay | -13.0 | 1.00 | 10 | 2,700 | 1,608 | 1,764 | 2.71 | N/A | N/A | 0.948 | N/A | 0.641 | N/A | N/A | NO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.01 |
| 23.50 | 71.13 | 1.06 | 1.48 | silty sand to sandy silt | -14.0 | 1.00 | 24 | 2,820 | 1,666 | 1,822 | 2.11 | 1.47 | 114.77 | 0.945 | 1.000 | 0.645 | 0.221 | 0.439 | YES | 2.8 | 27.6 | 1,200 | 34.8 | N/A | 0.099 | 0.01 | 0.00 |
| 24.50 | 284.05 | 3.98 | 1.40 | sand | -15.0 | 1.00 | 57 | 2,940 | 1,723 | 1,879 | 1.69 | 1.03 | 314.73 | 0.943 | 1.000 | 0.648 | N/A | N/A | NO | N/A | N/A | N/A | 58.6 | N/A | 0.000 | 0.00 | 0.00 |
| 25.50 | 221.17 | 1.61 | 0.73 | sand | -16.0 | 1.00 | 44 | 3,060 | 1,781 | 1,937 | 1.54 | 1.00 | 234.38 | 0.941 | 1.000 | 0.651 | N/A | N/A | NO | N/A | N/A | N/A | 44.9 | N/A | 0.000 | 0.00 | 0.00 |
| 26.50 | 347.78 | 1.46 | 0.42 | gravelly sand to sand | -17.0 | 1.00 | 58 | 3,180 | 1,838 | 1,994 | 1.24 | 1.00 | 362.75 | 0.938 | 1.000 | 0.654 | N/A | N/A | NO | N/A | N/A | N/A | 58.0 | N/A | 0.000 | 0.00 | 0.00 |
| 27.50 | 372.13 | 1.32 | 0.35 | gravelly sand to sand | -18.0 | 1.00 | 62 | 3,300 | 1,896 | 2,052 | 1.18 | 1.00 | 382.20 | 0.936 | 1.000 | 0.656 | N/A | N/A | NO | N/A | N/A | N/A | 61.2 | N/A | 0.000 | 0.00 | 0.00 |
| 28.50 | 553.42 | 1.46 | 0.26 | gravelly sand to sand | -19.0 | 1.00 | 92 | 3,420 | 1,954 | 2,110 | 0.97 | 1.00 | 559.95 | 0.934 | 1.000 | 0.659 | N/A | N/A | NO | N/A | N/A | N/A | 89.8 | N/A | 0.000 | 0.00 | 0.00 |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | #N/A | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| max= | 1,200 |
| min= | 316 |
| avg= | 818 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED GROUND SETTLEMENTS USING SPT DATA

<<------------------------------- GENERAL INPUT DATA -----------------------------------------><< ------------------------------------------------------------------------------------------------------------ REFERENCES ------------------------------------------------------------------------------------------->

| | |
|---|---|
| **Project Name** | Marina Del Rey - Parcel 44 |
| **Location** | Marina Del Rey |
| **GDC Project Number** | LA-1049 |
| **Exploration No.** | R-12-15 |
| **Ground Surf. Elevation** | 10.00 ft |
| **GWT Depth During Testing, $Z_w$** | 13.00 ft |
| **GWT Depth for Design, $Z_{wd}$** | 5.00 ft |
| **Soil Unit Weight, $\gamma_t$** | 120.00 pcf |
| **Earthquake Magnitude, $M_{eq}$** | 6.80 |
| **Peak Ground Acceelration, $A_{max}$** | 0.62 g |
| **Required FS** | 1.30 |

**+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)**

**++ Combination of corrrection factors for hammer energy ratio ($C_E$), borehole diameter ($C_B$), rod length ($C_R$), and sampling method ($C_S$). Correction Factor = $C_E C_B C_R C_S$**

**+++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$**

*** FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_\alpha$ where $K_\alpha$ =1.0 and MSF = 1.28**

**** $S_r$ value based on extrapolated median curve and limited to a maximum value of 1,200 psf (Seed & Harder, 1990)**

***** Based on Tokimatsu and Seed (1987) and Pradel (1998).**

**Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.**

**<<----------------------- SUMMARY OF RESULTS -------------------------->>**

**Total Thickness of Liquefiable Soils = 5.00 feet**

**Earthquake-Induced Settlements:**

| | | | |
|---|---|---|---|
| **- Liquefaction-Induced Settlement =** | **0.74** | **inches** | **<--- Saturated Sands** |
| **- Seismic Compaction Settlement =** | **0.00** | **inches** | **<--- Dry or Unsaturated Sands** |
| **Total:** | **0.74** | **inches** | |

| INPUT SOIL PROFILE | | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | RESIDUAL STRENGTH ** | | | GROUND SETTLEMENT *** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth $Z$ (ft) | Layer Thickness $H$ (ft) | USCS Soil Type | Equivalent SPT Blow Count $N$ (blows/ft) | Fines Content $FC$ (%) | Combined SPT Correction Factor ++ $C$ | Bottom of Layer Elevation (ft) | Total Vert. Stress (Design) $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Testing) $\sigma_{v'}$ (psf) | SPT Stress Correction Factor+ $C_N$ | Stress Corrected SPT Blow Count $(N_1)_{60}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Shear Stress Reduction Coeff.+ $r_d$ | Correction for High Overburden Stress+ $K_\sigma$ | Cyclic Stress Ratio++ $CSR$ | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction * $FS$ | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Cyclic Shear Strain ** $\gamma_c$ (%) | Vol. Strain ** $\varepsilon_v$ (%) | Layer Settlement ** $S_i$ (in.) |
| 10.00 | 5 | SM/ML | 14.7 | 15 | 1.09 | -2.5 | 1200 | 888 | 1200 | 1.291 | 20.7 | 24.2 | 0.977 | 1.000 | 0.532 | 0.277 | 0.668 | YES | 1.3 | 22.0 | 1,200 | N/A | 1.233 | 0.740 |

# EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED GROUND SETTLEMENTS USING SPT DATA

<<------------------------------- GENERAL INPUT DATA ---------------------------------------->

| | |
|---|---|
| **Project Name** | Marina Del Rey - Parcel 44 |
| **Location** | Marina Del Rey |
| **GDC Project Number** | LA-1049 |
| **Exploration No.** | R-12-16 |
| **Ground Surf. Elevation** | 16.00 ft |
| **GWT Depth During Testing, $Z_w$** | 14.00 ft |
| **GWT Depth for Design, $Z_{wd}$** | 11.00 ft |
| **Soil Unit Weight, $\gamma_t$** | 120.00 pcf |
| **Earthquake Magnitude, $M_{eq}$** | 6.80 |
| **Peak Ground Acceelration, $A_{max}$** | 0.62 g |
| **Required FS** | 1.30 |

<< ------------------------------------------------------------ REFERENCES ------------------------------------------------------------>

**+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)**

**++ Combination of corrrection factors for hammer energy ratio ($C_E$), borehole diameter ($C_B$), rod length ($C_R$), and sampling method ($C_S$). Correction Factor = $C_E\ C_B\ C_R\ C_S$**

**+++ CSR = 0.65 $A_{max}$ ($\sigma_v$/$\sigma_v$') $r_d$**

*** FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_\alpha$ where $K_\alpha$ =1.0 and MSF = 1.28**

**** $S_r$ value based on extrapolated median curve and limited to a maximum value of 1,200 psf (Seed & Harder, 1990)**

***** Based on Tokimatsu and Seed (1987) and Pradel (1998).**

**Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.**

**<<----------------------- SUMMARY OF RESULTS -------------------------->>**

**Total Thickness of Liquefiable Soils = 13.50 feet**

**Earthquake-Induced Settlements:**

| | | | |
|---|---|---|---|
| - Liquefaction-Induced Settlement = | 1.34 | inches | <--- Saturated Sands |
| - Seismic Compaction Settlement = | 0.00 | inches | <--- Dry or Unsaturated Sands |
| Total: | 1.34 | inches | |

| INPUT SOIL PROFILE | | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | RESIDUAL STRENGTH ** | | | GROUND SETTLEMENT *** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth $Z$ (ft) | Layer Thickness $H$ (ft) | USCS Soil Type | Equivalent SPT Blow Count $N$ (blows/ft) | Fines Content $FC$ (%) | Combined SPT Correction Factor ++ $C$ | Bottom of Layer Elevation (ft) | Total Vert. Stress (Design) $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Testing) $\sigma_{v'}$ (psf) | SPT Stress Correction Factor+ $C_N$ | Stress Corrected SPT Blow Count $(N_1)_{60}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Shear Stress Reduction Coeff.+ $r_d$ | Correction for High Overburden Stress+ $K_\sigma$ | Cyclic Stress Ratio++ $CSR$ | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction * $FS$ | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Cyclic Shear Strain ** $\gamma_c$ (%) | Vol. Strain ** $\varepsilon_v$ (%) | Layer Settlement ** $S_i$ (in.) |
| 12.75 | 3.5 | SP/SC | 19.4 | 16 | 1.09 | 1.5 | 1530 | 1421 | 1530 | 1.143 | 24.2 | 28.2 | 0.970 | 1.000 | 0.421 | 0.379 | 1.155 | YES | 1.4 | 25.6 | 1,200 | N/A | 0.318 | 0.134 |
| 20.00 | 5 | SC | 14.1 | 36 | 1.22 | -6.5 | 2400 | 1838 | 2026 | 0.994 | 17.1 | 25.5 | 0.953 | 1.000 | 0.502 | 0.302 | 0.774 | YES | 2.9 | 20.0 | 1,183 | N/A | 1.111 | 0.667 |
| 30.00 | 5 | SP-SM | 25.0 | 5 | 1.29 | -16.5 | 3600 | 2414 | 2602 | 0.877 | 28.3 | 28.3 | 0.930 | 0.928 | 0.559 | 0.380 | 0.810 | YES | 0.5 | 28.8 | 1,200 | N/A | 0.902 | 0.541 |

## EVALUATION OF LIQUEFACTION POTENTIAL AND EARTHQUAKE-INDUCED GROUND SETTLEMENTS USING SPT DATA

<<------------------------------- GENERAL INPUT DATA ---------------------------------------->

| | |
|---|---|
| **Project Name** | Marina Del Rey - Parcel 44 |
| **Location** | Marina Del Rey |
| **GDC Project Number** | LA-1049 |
| **Exploration No.** | R-12-17 |
| **Ground Surf. Elevation** | 18.00 ft |
| **GWT Depth During Testing, $Z_w$** | 16.00 ft |
| **GWT Depth for Design, $Z_{wd}$** | 13.00 ft |
| **Soil Unit Weight, $\gamma_t$** | 120.00 pcf |
| **Earthquake Magnitude, $M_{eq}$** | 6.80 |
| **Peak Ground Acceelration, $A_{max}$** | 0.62 g |
| **Required FS** | 1.30 |

<< ------------------------------------------------ REFERENCES ------------------------------------------------>

**+ Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops (Edited by: T.L. Youd and I.M. Idriss, 2001)**

**++ Combination of corrrection factors for hammer energy ratio ($C_E$), borehole diameter ($C_B$), rod length ($C_R$), and sampling method ($C_S$). Correction Factor = $C_E C_B C_R C_S$**

**+++ CSR = 0.65 $A_{max}$ ($\sigma_v/\sigma_v'$) $r_d$**

*** FS = ($CRR_{7.5}$/CSR) MSF $K_\sigma$ $K_\alpha$ where $K_\alpha$ =1.0 and MSF = 1.28**

**** $S_r$ value based on extrapolated median curve and limited to a maximum value of 1,200 psf (Seed & Harder, 1990)**

***** Based on Tokimatsu and Seed (1987) and Pradel (1998).**

**Note: This analysis asssumes level ground condition and depth of liquefiable soils does not change.**

**<<----------------------- SUMMARY OF RESULTS -------------------------->>**

**Total Thickness of Liquefiable Soils = 4.50 feet**

**Earthquake-Induced Settlements:**

**- Liquefaction-Induced Settlement = 0.81 inches <--- Saturated Sands**

**- Seismic Compaction Settlement = 0.00 inches <--- Dry or Unsaturated Sands**

**Total: 0.81 inches**

| INPUT SOIL PROFILE | | | | | | SOIL LIQUEFACTION POTENTIAL ANALYSIS (1996 NCEER & 1998 NCEER/NSF WORKSHOPS) + | | | | | | | | | | | | | RESIDUAL STRENGTH ** | | | GROUND SETTLEMENT *** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Depth $Z$ (ft) | Layer Thickness $H$ (ft) | USCS Soil Type | Equivalent SPT Blow Count $N$ (blows/ft) | Fines Content $FC$ (%) | Combined SPT Correction Factor ++ $C$ | Bottom of Layer Elevation (ft) | Total Vert. Stress (Design) $\sigma_v$ (psf) | Effective Vert. Stress (Design) $\sigma_{v'}$ (psf) | Effective Vert. Stress (Testing) $\sigma_{v'}$ (psf) | SPT Stress Correction Factor+ $C_N$ | Stress Corrected SPT Blow Count $(N_1)_{60}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Shear Stress Reduction Coeff.+ $r_d$ | Correction for High Overburden Stress+ $K_\sigma$ | Cyclic Stress Ratio++ $CSR$ | Cyclic Res. Ratio $CRR_{7.5}$ | Factor of Safety Against Liqefaction * $FS$ | Liquefy ? | SPT Blow Count Correction $N_{corr.}$ | Fines Corrected SPT Blow Count $(N_1)_{60cs}$ | Residual Shear Strength $S_r$ (psf) | Cyclic Shear Strain ** $\gamma_c$ (%) | Vol. Strain ** $\varepsilon_v$ (%) | Layer Settlement ** $S_i$ (in.) |
| 15.25 | 4.5 | SC | 12.7 | 16 | 1.22 | 0.5 | 1830 | 1690 | 1830 | 1.045 | 16.2 | 19.8 | 0.964 | 1.000 | 0.421 | 0.213 | 0.651 | YES | 1.4 | 17.6 | -758 | N/A | 1.494 | 0.807 |

METHANE
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methanespecialists.com

September 19, 2012
J2602Br5

**Pacific Marina Venture, LLC**
**c/o Pacific Ocean Management, LLC**
**13737 Fiji Way**
**Marina Del Rey, CA - 90292**

**Attn: Mr. Mike Selden**

**Tel: (949) 644-4465**

**Email: mseldon@pom-ndr.com**

**Subj: Site Methane Investigation Report for Proposed Construction project at:**

**Parcel 44**
**13433 Fiji Way,**
**Marina Del Rey, CA - 90292**

Methane Specialists has completed a methane investigation to determine the measurable level of methane of the proposed site at 13433 Fiji Way, Marina Del Rey, CA – 90292

The investigation is for the construction of a commercial establishment, along Pier 44, around Basin G, to be built completely on-grade. A ''Geotechnical Engineering Report'' of Parcel 44, identified as GDC Project No. LA-1049, dated June 01, 2012, conducted by Group Delta Consultant, Inc., has been provided to us. Said Report recorded ground water at a depth of 5' above Mean Sea Level (MSL). Methane Specialists found the ground water level to be approximately 4 to 6 feet below surface grade (bsg), probably due to time and Tidal differences.

The area of interest is reported to be approximately 445,600 square feet. Methane Specialists bored forty-three (43) shallow methane monitoring probe wells at 4 feet, bsg, and twenty-three (23) deeper wells at 5 to 7 feet, bsg. Refusal was not met at any probe depth. (See typical multi-stage monitoring well detail attached). The probe-sets were temporary, and may now be destroyed (See attached Probe Location Maps).

As per the California Department of Conservation, through it's Division of Oil, Gas and Geothermal Resources (DOGGR) Online Mapping System (DOMS), no oil well is shown to be close enough to the project to impact the construction of this project (See attached DOMS map).

Each of the probes was monitored with a portable combustible methane gas detector and pressure-tested with a magnehelic gauge. Monitoring took place on two occasions with a minimum 24-hour interval between events during periods of falling barometric pressure. The methane test results are attached.

In summary, at one of the probes, a methane gas *quantity* was detected at SP-45, on August 1, 2012, as high as the 60,000 ppmv (parts per million by volume) level, which is 6% by volume, 120% of the Lower Explosive Limit (LEL) of methane, and 40% of the Upper Explosive Limit (UEL) of methane, but no significant methane gas *pressures* were detected at *any* of the probes (see attached Gas Monitoring Log sheets). The next highest reading was 3,000 ppmv.

According to the Section 110.4, Title 26, Volume 1, of the California Building Code, of the Los Angeles County Code, new methane mitigation is required only for new buildings or structures to be located "within 25 feet on an active, abandoned, or idle oil or gas well(s)". The entire parcel is located at least 200 feet from all such wells, as shown on the DOMS (see attached DOMS Oil Well Location Map).

Based on the results of the site investigation, DOGGR map research and the Los Angeles County Methane requirements, additional mitigation of the proposed project is not required. The preliminary project plans supplied by the client do not fall within 25 feet of an abandoned oil well or within 200 feet of an active oil well.

Methane Specialists also recommends soil gas monitoring during excavation.

All discussion in this report is based on information provided by the client, as well as data and conditions, as they existed at the time and date of testing at the site. Should any detail, or condition, change from that original information, then, re-consideration of the conclusions in this report could become justified. Methane Specialists cannot be held accountable for relevant information not provided. Nor can Methane Specialists be held accountable for the consequences of changes in the project scope, or of project site conditions.

This report has been prepared for the sole use of the client, exclusively, for the completion of the subject project, alone. No other application, or interpretation, of this report is to be granted, or implied, or otherwise made, without first obtaining direct, written permission, exclusively from Methane Specialists.

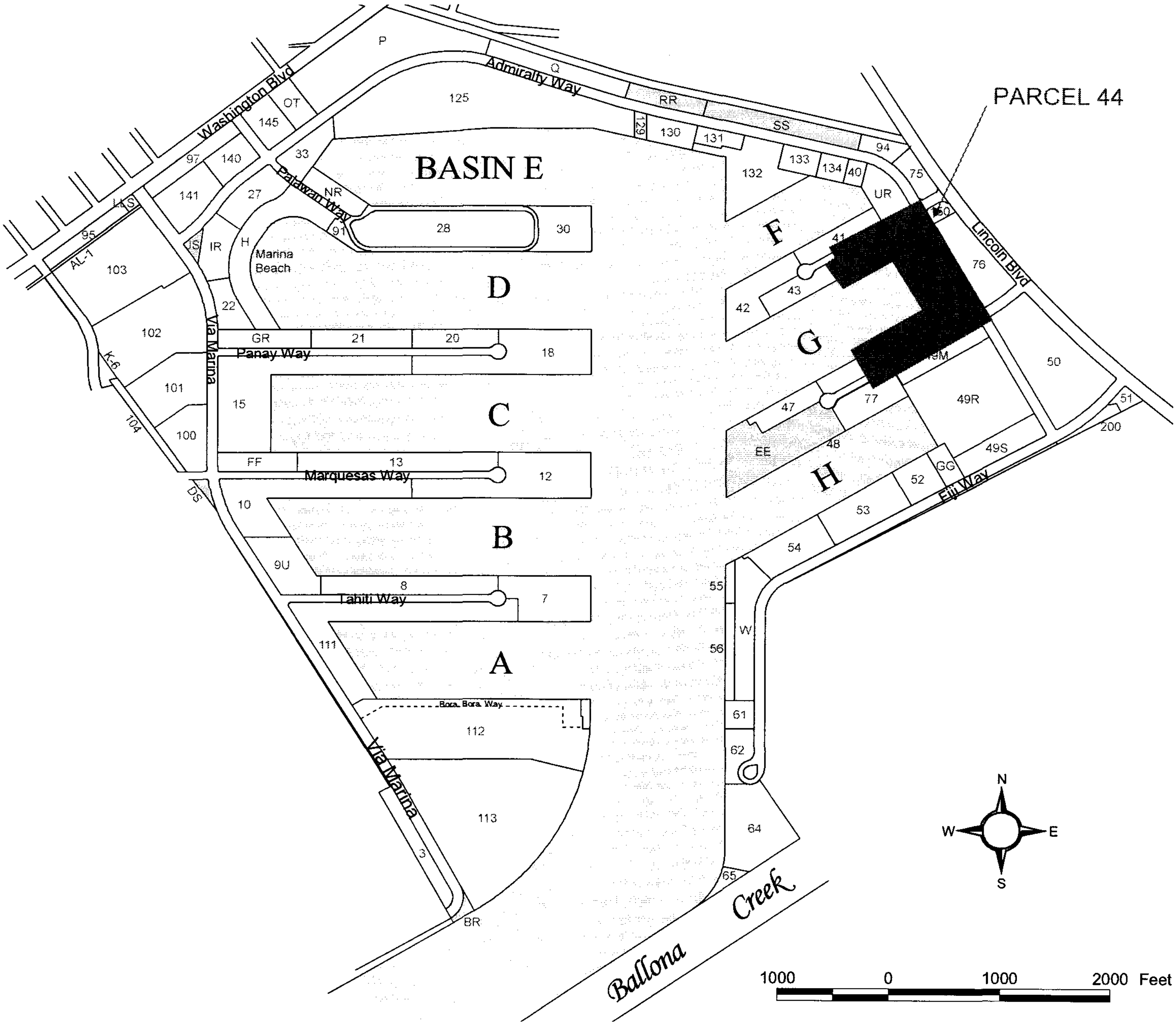
Respectfully,
Methane Specialists

REGISTERED PROFESSIONAL ENGINEER
KIRBY N. ARRIOLA
NO. 31416
Exp. 12-31-12
CIVIL
STATE OF CALIFORNIA

Kirby N. Arriola, P.E. (C-31416)

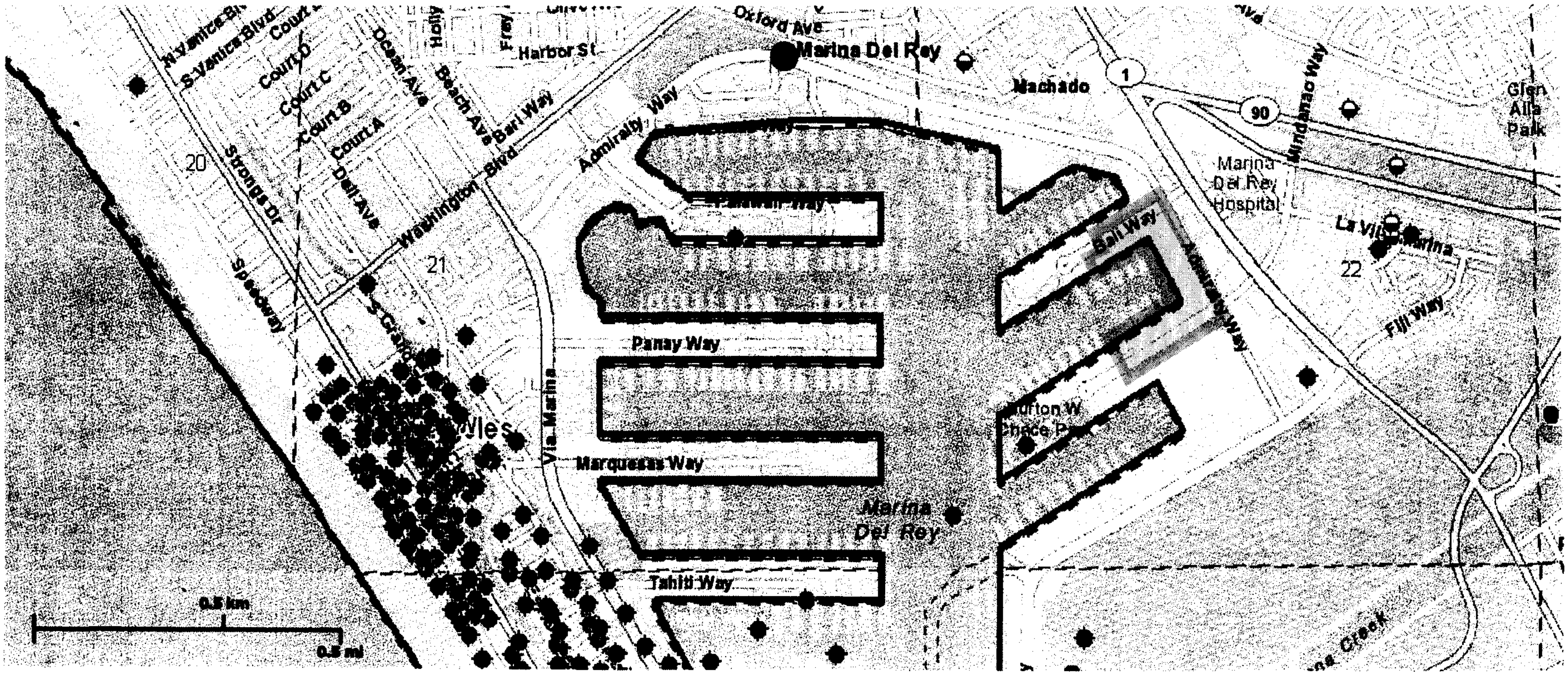
# INDEX OF ENCLOSURES

# Marina del Rey Lease Parcel Areas




Map March 2007 by Chris Sellers, Los Angeles County Department of Beaches and Harbors

# DOGGR Online Mapping System (DOMS)

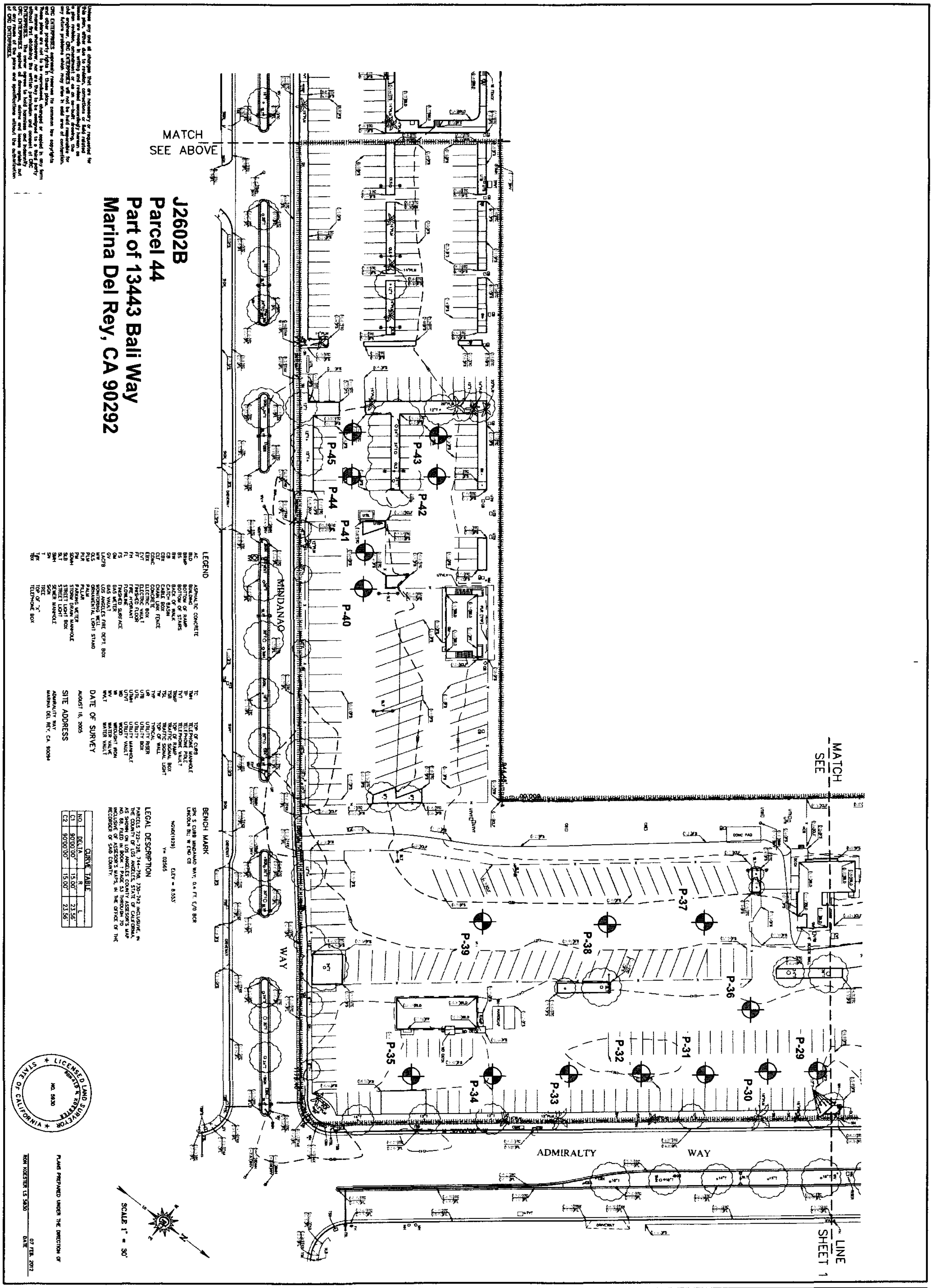



**Disclaimer**: The well information and data represented on this site varies in accuracy, scale, origin and completeness and may be changed at any time without notice. While the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOC) makes every effort to provide accurate information, DOC makes no warranties as to the suitability of this product for any particular purpose. Any use of this information is at the user's own risk.

For further information or suggestions regarding the data on this site, please contact the Division of Oil, Gas, and Geothermal Resources, Technical Services Unit at 801 K St, MS 20-20, Sacramento, CA, 95814 or email doggrwebmaster@conservation.ca.gov.

California Department of Conservation, Division of Oil, Gas and Geothermal Resources.

Printed on: Jul 26 - 4:09:49 PM
URL - http://maps.conservation.ca.gov/doms/




**CRC Enterprises**

27600 Bouquet Canyon Road Suite 200 Santa Clarita Ca. 91350

Telephone (661) 297-2336 FAX (661) 297-2331

PREPARED FOR

PACIFIC OCEAN MANAGMENT

13575 MINDANAO WAY

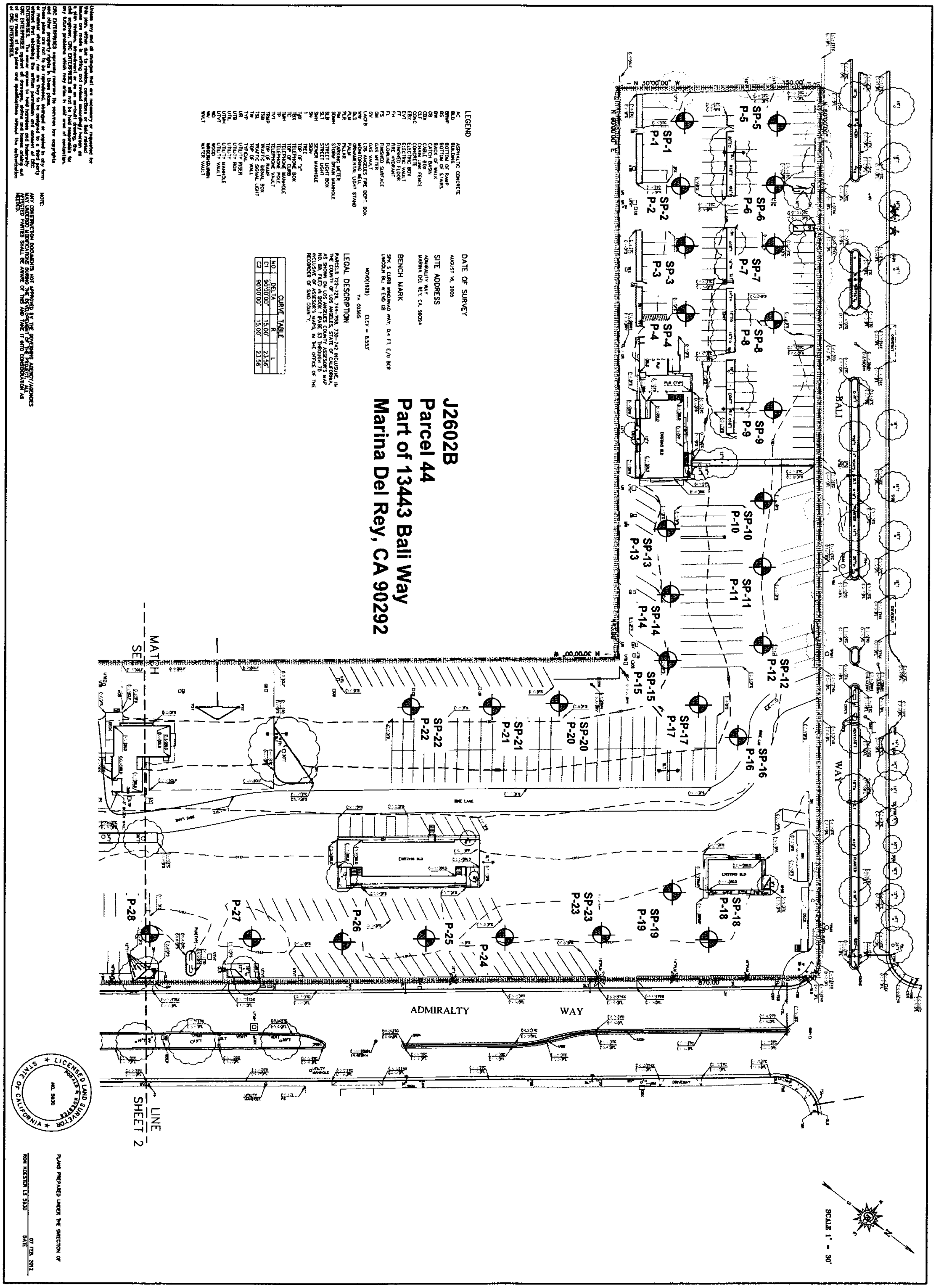
MARINA DEL REY, CA. 90292

TOPOGRAPHIC SURVEY

SHEET 2 OF 2 SHEET

CRC 2090

| DATE | REVISIONS |
| --- | --- |
| | |

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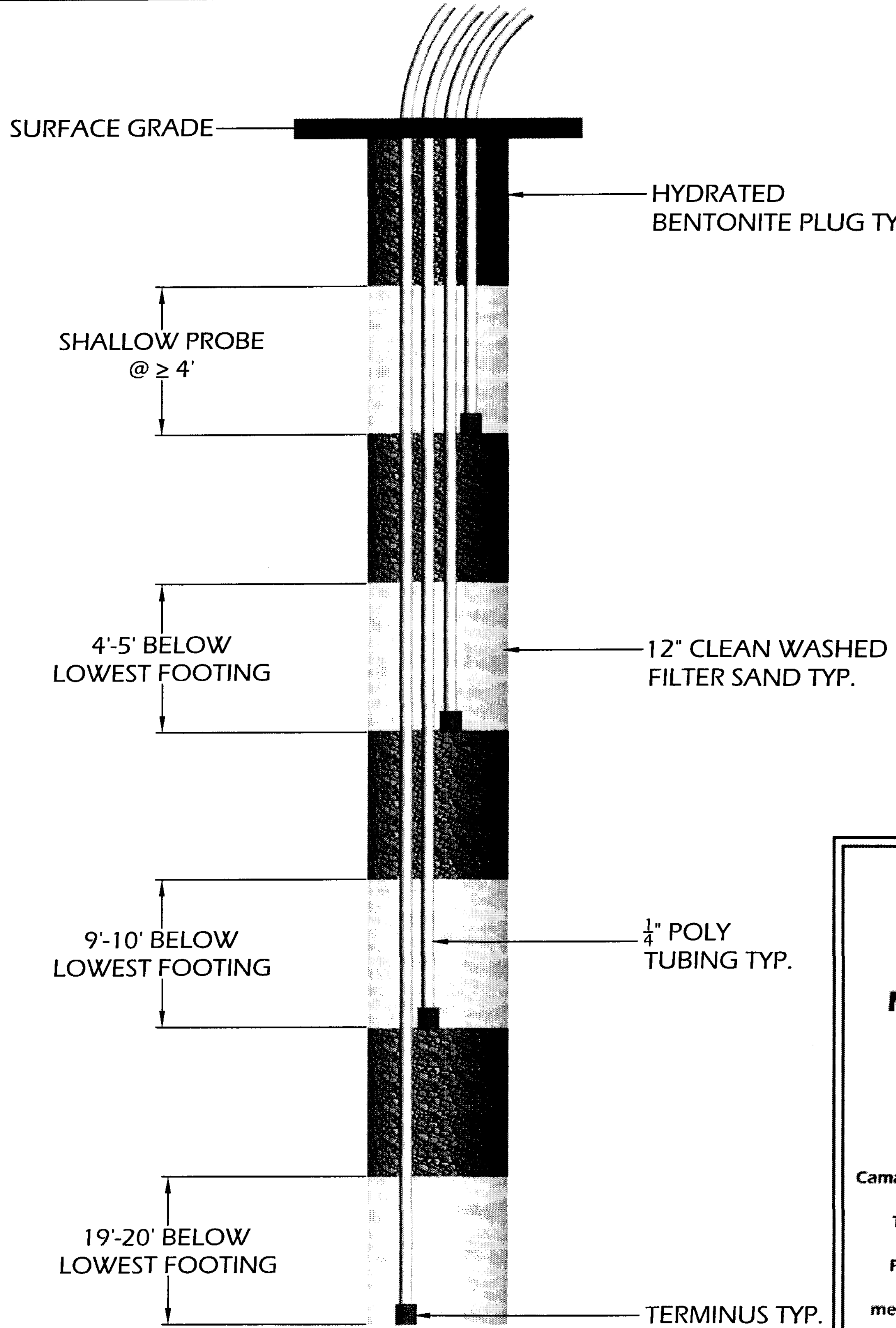
TOPOGRAPHIC SURVEY

SHEET 1 OF 2 SHEET CRC 2090

| DATE | REVISIONS |
|---|---|
| | |




**METHANE**
SPECIALISTS

621 Via Alondra

Suite 611

Camarillo, California 93012

TEL: 805.987.5356

FAX: 805.987.3968

methanespecialists.com

**TEMPORARY MULTI-STAGE GAS MONITORING PROBES FOR METHANE**

# GAS MONITORING LOG



METHANE SPECIALISTS

PROJECT ADDRESS: Parcel 44 (Admiralty Way and Mindinao))

JOB NUMBER: J2602B

REASON FOR TESTING::

X OIL WELL(S) NEARBY
☐ METHANE ZONE
☐ BUFFER ZONE
☐ LANDFILL
☐ FORMER LIVESTOCK AREA
☐ CONTAMINATED SITE

TESTER: DR

INSTRUMENT: RKI EAGLE

| PROBE | DEPTH FT. | DATE | TIME | CH4 % LEL | O2 % VOL | H2S PPM | CO/CO2 % VOL | GAS PRESS. IN. - H2O | PEAK READINGS |
|---|---|---|---|---|---|---|---|---|---|
| P-1 | 5 | 8/1/2012 | 1:35 | ND | 18.8% | <0.1 | 2.8% | <0.1 | |
| SP-1 | 4 | 8/1/2012 | 1:40 | 1% LEL | 20.9% | <0.1 | 0.6% | <0.1 | |
| P-2 | 6 | 8/1/2012 | 1:50 | 1% LEL | 20.8% | <0.1 | 0.8% | <0.1 | |
| SP-2 | 4 | 8/1/2012 | 1:55 | ND | 20.9% | <0.1 | 0.2% | <0.1 | |
| P-3 | 7 | 8/1/2012 | 2:15 | LF | | | | | LOW FLOW |
| SP-3 | 4 | 8/1/2012 | 2:20 | 1% LEL | 20.7% | <0.1 | 0.5% | <0.1 | |
| P-4 | 6 | 8/1/2012 | 2:30 | 1% LEL | 19.7% | <0.1 | 2.8% | <0.1 | |
| SP-4 | 4 | 8/1/2012 | 2:40 | 1% LEL | 20.9% | <0.1 | 0.2% | <0.1 | |
| P-5 | 6 | 8/2/2012 | 12:20 | 2% LEL | 17.9% | <0.1 | 5.3% | <0.1 | |
| SP-5 | 4 | 8/2/2012 | 12:25 | ND | 19.4% | <0.1 | 1.6% | <0.1 | |
| P-6 | 6 | 8/2/2012 | 12:30 | 1% LEL | 19.2% | <0.1 | 1.8% | <0.1 | |
| SP-6 | 4 | 8/2/2012 | 12:40 | ND | 18.3% | <0.1 | 4.5% | <0.1 | |
| P-7 | 6 | 8/2/2012 | 12:45 | ND | 18.7% | <0.1 | 4.0% | <0.1 | |
| SP-7 | 4 | 8/2/2012 | 12:50 | ND | 20.9% | <0.1 | 1.2% | <0.1 | |
| P-8 | 6 | 8/2/2012 | 12:55 | 1% LEL | 18.3% | <0.1 | 5.1% | <0.1 | |
| SP-8 | 4 | 8/2/2012 | 1:00 | ND | 18.4% | <0.1 | 4.3% | <0.1 | |
| P-9 | 6 | 8/2/2012 | 1:15 | ND | 20.6% | <0.1 | 9.4% | <0.1 | |
| SP-9 | 4 | 8/2/2012 | 1:20 | ND | 16.1% | <0.1 | 9.2% | <0.1 | |
| P-10 | 6 | 8/2/2012 | 2:15 | ND | 201.% | <0.1 | 2.4% | <0.1 | CH4-3% LEL |
| SP-10 | 4 | 8/2/2012 | 2:20 | ND | 20.2% | <0.1 | 4.0% | <0.1 | |
| P-11 | 6 | 8/2/2012 | 2:50 | ND | 11.4% | <0.1 | 18.7% | <0.1 | |
| SP-11 | 4 | 8/2/2012 | 2:55 | 1% LEL | 11.9% | <0.1 | 16.2% | <0.1 | |
| P-12 | 6 | 8/2/2012 | 3:10 | ND | 12.6% | <0.1 | 16.2% | <0.1 | |
| SP-12 | 4 | 8/2/2012 | 3:15 | ND | 12.2% | <0.1 | 16.9% | <0.1 | |
| P-13 | 6 | 8/2/2012 | 1:30 | ND | 16.1% | <0.1 | 2.4% | <0.1 | |
| SP-13 | 4 | 8/2/2012 | 1:35 | ND | 20.9% | <0.1 | 1.4% | <0.1 | CH4-3% LEL |
| P-14 | 6 | 8/2/2012 | 1:40 | LF | | | | | LOW FLOW |
| SP-14 | 4 | 8/2/2012 | 1:42 | ND | 20.9% | <0.1 | 2.0% | <0.1 | |
| P-15 | 6 | 8/2/2012 | 1:55 | ND | 13.3% | <0.1 | 6.0% | <0.1 | |
| SP-15 | 4 | 8/2/2012 | 2:00 | ND | 17.9% | <0.1 | 6.0% | <0.1 | |
| | | | | | | | | | |

INSTRUMENT CALIBRATION RECORD

DATE: 8/1/12___ TIME: ____9:00___ INT: ___DR___

DATE: 8/2/12____ TIME: ____7:00___ INT: ___DR___

DATE: ___________ TIME: ___________ INT: _________

WATER ENCOUNTERD? (Y) (N) DEPTH: _____7'______

REFUSAL? (Y) (N) DEPTH: ___________

COMMENTS:

# GAS MONITORING LOG



PROJECT ADDRESS: Parcel 44 (Admiralty Way and Mindinao))

JOB NUMBER: J2602B

REASON FOR TESTING::

X OIL WELL(S) NEARBY
☐ METHANE ZONE
☐ BUFFER ZONE
☐ LANDFILL
☐ FORMER LIVESTOCK AREA
☐ CONTAMINATED SITE

METHANE SPECIALISTS

TESTER: DR

INSTRUMENT: RKI EAGLE

| PROBE | DEPTH FT. | DATE | TIME | CH4 % LEL | O2 % VOL | H2S PPM | CO/CO2 % VOL | GAS PRESS. IN. - H2O | PEAK READINGS |
|---|---|---|---|---|---|---|---|---|---|
| P-16 | 6 | 8/3/2012 | 8:45 | 2% LEL | 19.8% | <0.1 | 1.9% | <0.1 | |
| SP-16 | 4 | 8/3/2012 | 8:50 | 1% LEL | 20.1% | <0.1 | 1.3% | <0.1 | |
| P-17 | 6 | 8/3/2012 | 8:58 | ND | 20.9% | <0.1 | 0.7% | <0.1 | |
| SP-17 | 4 | 8/3/2012 | 9:03 | ND | 20.9% | <0.1 | 0.4% | <0.1 | |
| P-18 | 6 | 8/3/2012 | 9:10 | ND | 18.4% | <0.1 | 1.2% | <0.1 | |
| SP-18 | 4 | 8/3/2012 | 9:15 | ND | 19.8% | <0.1 | 1.6% | <0.1 | |
| P-19 | 6 | 8/3/2012 | 9:30 | 1% LEL | 18.4% | <0.1 | 0.9% | <0.1 | |
| SP-19 | 4 | 8/3/2012 | 9:35 | ND | 20.7% | <0.1 | 1.2% | <0.1 | |
| P-20 | 6 | 8/3/2012 | 9:40 | ND | 17.1% | <0.1 | 0.9% | <0.1 | |
| SP-20 | 4 | 8/3/2012 | 9:45 | ND | 18.1% | <0.1 | 3.0% | <0.1 | |
| P-21 | 6 | 8/3/2012 | 9:56 | ND | 14.7% | <0.1 | 8.3% | <0.1 | |
| SP-21 | 4 | 8/3/2012 | 10:01 | ND | 20.9% | <0.1 | 0.6% | <0.1 | |
| P-22 | 6 | 8/3/2012 | 10:13 | 1% LEL | 18.6% | <0.1 | 2.5% | <0.1 | |
| SP-22 | 4 | 8/3/2012 | 10:17 | ND | 21.2% | <0.1 | ND | <0.1 | |
| P-23 | 6 | 8/3/2012 | 1:05 | 1% LEL | 11.4% | <0.1 | 11.4% | <0.1 | |
| SP-23 | 4 | 8/3/2012 | 1:10 | ND | 12.5% | <0.1 | 8.4% | <0.1 | |
| SP-24 | 4 | 8/3/2012 | 1:25 | 1% LEL | 12.0% | <0.1 | 7.4% | <0.1 | |
| SP-25 | 4 | 8/3/2012 | 1:38 | ND | 20.4% | <0.1 | 4.0% | <0.1 | |
| SP-26 | 4 | 8/3/2012 | 1:46 | 1% LEL | 10.6% | <0.1 | 12.4% | <0.1 | |
| SP-27 | 4 | 8/3/2012 | 1:57 | ND | 13.0% | <0.1 | 9.8% | <0.1 | |
| SP-28 | 4 | 8/3/2012 | 2:07 | ND | 17.3% | <0.1 | 6.1% | <0.1 | |
| SP-29 | 4 | 8/3/2012 | 2:25 | 1% LEL | 14.4% | <0.1 | 9.0% | <0.1 | |
| SP-30 | 4 | 8/3/2012 | 2:35 | 1% LEL | 9.0% | <0.1 | 20.0% | <0.1 | |
| SP-31 | 4 | 8/6/2012 | 11:00 | 4% LEL | 10.1% | <0.1 | 15.0% | <0.1 | |
| SP-32 | 4 | 8/6/2012 | 11:10 | ND | 17.0% | <0.1 | 5.7% | <0.1 | |
| SP-33 | 4 | 8/6/2012 | 11:15 | ND | 22.4% | <0.1 | 0.6% | <0.1 | |
| SP-34 | 4 | 8/6/2012 | 11:20 | ND | 20.9% | <0.1 | 1.2% | <0.1 | |
| SP-35 | 4 | 8/6/2012 | 11:27 | 4% LEL | 13.2% | <0.1 | 12.5% | <0.1 | CH4-20% LEL |
| SP-36 | 4 | 8/6/2012 | 11:33 | ND | 3.2% | <0.1 | 20.0% | <0.1 | |
| SP-37 | 4 | 8/6/2012 | 11:46 | 1% LEL | 20.9% | <0.1 | 7.6% | <0.1 | CH4-65% LEL |
| | | | | | | | | | |

INSTRUMENT CALIBRATION RECORD

DATE: 8/3/12___ TIME: ____8:40___ INT: ___DR___

DATE: 8/6/12____ TIME: __10::55___ INT: ___DR__

DATE: __________ TIME: ___________ INT: _________

WATER ENCOUNTERD? (Y) (N) DEPTH: ___________

REFUSAL? (Y) (N) DEPTH: ___________

COMMENTS:

# GAS MONITORING LOG



PROJECT ADDRESS: Parcel 44 (Admiralty Way and Mindinao))

JOB NUMBER: J2602B

REASON FOR TESTING::

- X OIL WELL(S) NEARBY
- ☐ METHANE ZONE
- ☐ BUFFER ZONE
- ☐ LANDFILL
- ☐ FORMER LIVESTOCK AREA
- ☐ CONTAMINATED SITE

METHANE SPECIALISTS

TESTER: DR

INSTRUMENT: RKI EAGLE

| PROBE | DEPTH FT. | DATE | TIME | CH4 % LEL | O2 % VOL | H2S PPM | CO/CO2 % VOL | GAS PRESS. IN. - H2O | PEAK READINGS |
|---|---|---|---|---|---|---|---|---|---|
| SP-38 | 4 | 8/6/2012 | 11:55 | LF | | | | | LOW FLOW |
| SP-39 | 4 | 8/6/2012 | 12:00 | ND | 20.9% | <0.1 | 0.4% | <0.1 | |
| SP-40 | 4 | 8/6/2012 | 12:10 | 5% LEL | 1.4% | <0.1 | 20.0% | <0.1 | |
| SP-41 | 4 | 8/6/2012 | 12:15 | 1% LEL | 15.2% | <0.1 | 6.4% | <0.1 | |
| SP-42 | 4 | 8/6/2012 | 12:30 | 1% LEL | 16.5% | <0.1 | 9.0% | <0.1 | |
| SP-43 | 4 | 8/6/2012 | 12:20 | ND | 14.4% | <0.1 | 15.6% | <0.1 | |
| SP-44 | 4 | 8/6/2012 | 2:00 | LF | | | | | LOW FLOW |
| SP-45 | 4 | 8/6/2012 | 2:30 | 6.0% VOL. | 0.2% | <0.1 | 20.0% | <0.1 | |

INSTRUMENT CALIBRATION RECORD

DATE: 8/6/12 TIME: 11:50 INT: DR

DATE: ________ TIME: ________ INT: ________

DATE: ________ TIME: ________ INT: ________

WATER ENCOUNTERD? (Y) (N) DEPTH: ________

REFUSAL? (Y) (N) DEPTH: ________

COMMENTS:

# GAS MONITORING LOG



PROJECT ADDRESS: Parcel 44 (Admiralty Way and Mindinao))

JOB NUMBER: J2602B

REASON FOR TESTING::

X OIL WELL(S) NEARBY
☐ METHANE ZONE
☐ BUFFER ZONE
☐ LANDFILL
☐ FORMER LIVESTOCK AREA
☐ CONTAMINATED SITE

**METHANE SPECIALISTS**

TESTER: DR

INSTRUMENT: RKI EAGLE

| PROBE | DEPTH FT. | DATE | TIME | CH4 % LEL | O2 % VOL | H2S PPM | CO/CO2 % VOL | GAS PRESS. IN. - H2O | PEAK READINGS |
|---|---|---|---|---|---|---|---|---|---|
| P-1 | 5 | 8/8/2012 | 7:25 | ND | 18.6% | <0.1 | 3.3% | <0.1 | |
| SP-1 | 4 | 8/8/2012 | 7:30 | ND | 20.7% | <0.1 | 0.9% | <0.1 | |
| P-2 | 6 | 8/8/2012 | 7:40 | ND | 20.0% | <0.1 | 1.8% | <0.1 | |
| SP-2 | 4 | 8/8/2012 | 7;45 | ND | 20.5% | <0.1 | 1.1% | <0.1 | |
| P-3 | 7 | 8/8/2012 | 7:53 | LF | | | | | LOW FLOW |
| SP-3 | 4 | 8/8/2012 | 7:54 | ND | 20.4% | <0.1 | 1.2% | <0.1 | |
| P-4 | 6 | 8/8/2012 | 8:00 | ND | 19.0% | <0.1 | 2.8% | <0.1 | |
| SP-4 | 4 | 8/8/2012 | 8:05 | ND | 20.5% | <0.1 | 0.9% | <0.1 | |
| P-5 | 6 | 8/8/2012 | 8:10 | ND | 19.0% | <0.1 | 2.6% | <0.1 | |
| SP-5 | 4 | 8/8/2012 | 8:15 | 1% LEL | 19.0% | <0.1 | 2.3% | <0.1 | |
| P-6 | 6 | 8/8/2012 | 8:20 | ND | 18.0% | <0.1 | 5.7% | <0.1 | |
| SP-6 | 4 | 8/8/2012 | 8:30 | ND | 18.7% | <0.1 | 2.6% | <0.1 | |
| P-7 | 6 | 8/8/2012 | 8:38 | 2% LEL | 18.9% | <0.1 | 2.4% | <0.1 | |
| SP-7 | 4 | 8/8/2012 | 8:43 | 1% LEL | 20.9% | <0.1 | 0.1% | <0.1 | |
| P-8 | 6 | 8/8/2012 | 8:50 | ND | 17.4% | <0.1 | 6.6% | <0.1 | |
| SP-8 | 4 | 8/8/2012 | 8:55 | ND | 17.8% | <0.1 | 5.5% | <0.1 | |
| P-9 | 6 | 8/8/2012 | 9:05 | ND | 15.3% | <0.1 | 12.2% | <0.1 | |
| SP-9 | 4 | 8/8/2012 | 9:10 | ND | 14.6% | <0.1 | 13.2% | <0.1 | |
| P-10 | 6 | 8/8/2012 | 9:27 | ND | 17.8% | <0.1 | 5.4% | <0.1 | |
| SP-10 | 4 | 8/8/2012 | 9:33 | ND | 14.9% | <0.1 | 4.9% | <0.1 | |
| P-11 | 6 | 8/8/2012 | 9:40 | ND | 12.1% | <0.1 | 17.3% | <0.1 | |
| SP-11 | 4 | 8/8/2012 | 9:45 | ND | 13.1% | <0.1 | 13.3% | <0.1 | |
| P-12 | 6 | 8/8/2012 | 9:54 | ND | 14.2% | <0.1 | 13.1% | <0.1 | |
| SP-12 | 4 | 8/8/2012 | 10:00 | ND | 18.7% | <0.1 | 14.2% | <0.1 | |
| P-13 | 6 | 8/8/2012 | 10:05 | LF | | | | | LOW FLOW |
| SP-13 | 4 | 8/8/2012 | 10:10 | LF | | | | | LOW FLOW |
| P-14 | 6 | 8/8/2012 | 10:12 | LF | | | | | LOW FLOW |
| SP-14 | 4 | 8/8/2012 | 10:15 | ND | 7.9% | <0.1 | 20.0% | <0.1 | |
| P-15 | 6 | 8/8/2012 | 10:20 | ND | 18.6% | <0.1 | 7.2% | <0.1 | |
| SP-15 | 4 | 8/8/2012 | 10:25 | ND | 20.2% | <0.1 | 8.0% | <0.1 | |
| | | | | | | | | | |

INSTRUMENT CALIBRATION RECORD

DATE: 8/8/12___ TIME: ____7:20___ INT: ___DR___

DATE:__________ TIME: __________ INT: ________

DATE: __________ TIME: __________ INT: ________

WATER ENCOUNTERD? (Y) (N) DEPTH: ___________

REFUSAL? (Y) (N) DEPTH: ___________

COMMENTS:

# GAS MONITORING LOG



PROJECT ADDRESS: Parcel 44 (Admiralty Way and Mindinao))

JOB NUMBER: J2602B

REASON FOR TESTING::

X OIL WELL(S) NEARBY
☐ METHANE ZONE
☐ BUFFER ZONE
☐ LANDFILL
☐ FORMER LIVESTOCK AREA
☐ CONTAMINATED SITE

METHANE SPECIALISTS

TESTER: DR

INSTRUMENT: RKI EAGLE

| PROBE | DEPTH FT. | DATE | TIME | CH4 % LEL | O2 % VOL | H2S PPM | CO/CO2 % VOL | GAS PRESS. IN. - H2O | PEAK READINGS |
|---|---|---|---|---|---|---|---|---|---|
| P-16 | 6 | 8/8/2012 | 10:28 | LF | | | | | LOW FLOW |
| SP-16 | 4 | 8/8/2012 | 10:30 | ND | 19.8% | <0.1 | 1.9% | <0.1 | |
| P-17 | 6 | 8/8/2012 | 10:38 | ND | 20.0% | <0.1 | 1.4% | <0.1 | |
| SP-17 | 4 | 8/8/2012 | 10:43 | ND | 20.4% | <0.1 | 0.9% | <0.1 | |
| P-18 | 6 | 8/8/2012 | 10:50 | ND | | | | | LOW FLOW |
| SP-18 | 4 | 8/8/2012 | 10:55 | ND | | | | | LOW FLOW |
| P-19 | 6 | 8/8/2012 | 11:06 | ND | 19.2% | <0.1 | 0.2% | <0.1 | |
| SP-19 | 4 | 8/8/2012 | 11:05 | ND | 9.9% | <0.1 | 18.6% | <0.1 | |
| P-20 | 6 | 8/8/2012 | 12:18 | 2% LEL | 1.6% | <0.1 | 20.0% | <0.1 | |
| SP-20 | 4 | 8/8/2012 | 12:23 | ND | 3.6% | <0.1 | 20.0% | <0.1 | |
| P-21 | 6 | 8/8/2012 | 12:27 | ND | 19.2% | <0.1 | 1.7% | <0.1 | |
| SP-21 | 4 | 8/8/2012 | 12:33 | ND | 17.6% | <0.1 | 2.4% | <0.1 | |
| P-22 | 6 | 8/8/2012 | 12:35 | 2% LEL | 11.1% | <0.1 | 13.6% | <0.1 | |
| SP-22 | 4 | 8/8/2012 | 12:40 | ND | 22.4% | <0.1 | ND | <0.1 | |
| P-23 | 6 | 8/8/2012 | 12:45 | ND | 12.9% | <0.1 | 5.7% | <0.1 | |
| SP-23 | 4 | 8/8/2012 | 12:50 | ND | 14.2% | <0.1 | 5.2% | <0.1 | |
| SP-24 | 4 | 8/8/2012 | 12:55 | ND | 16.3% | <0.1 | 3.8% | <0.1 | |
| SP-25 | 4 | 8/8/2012 | 1:00 | ND | 18.0% | <0.1 | 6.2% | <0.1 | |
| SP-26 | 4 | 8/8/2012 | 1:05 | 1% LEL | 7.6% | <0.1 | 19.8% | <0.1 | |
| SP-27 | 4 | 8/8/2012 | 1:15 | ND | 13.4% | <0.1 | 9.9% | <0.1 | |
| SP-28 | 4 | 8/8/2012 | 1:23 | ND | 13.5% | <0.1 | 12.6% | <0.1 | |
| SP-29 | 4 | 8/8/2012 | 1:38 | 1% LEL | 17.6% | <0.1 | 5.7% | <0.1 | |
| SP-30 | 4 | 8/8/2012 | 1:30 | 1% LEL | 8.5% | <0.1 | 20.0% | <0.1 | |
| SP-31 | 4 | 8/8/2012 | 2:05 | ND | 9.0% | <0.1 | 20.0% | <0.1 | |
| SP-32 | 4 | 8/8/2012 | 1:42 | 1% LEL | 17.2% | <0.1 | 5.6% | <0.1 | |
| SP-33 | 4 | 8/8/2012 | 1:47 | LF | | | | | LOW FLOW |
| SP-34 | 4 | 8/8/2012 | 1:50 | ND | 19.8% | <0.1 | 2.2% | <0.1 | |
| SP-35 | 4 | 8/8/2012 | 1:57 | 22% LEL | 4.9% | <0.1 | 20.0% | <0.1 | CH4-60% LEL |
| SP-36 | 4 | 8/8/2012 | 2:13 | ND | 0.9% | <0.1 | 20.0% | <0.1 | |
| SP-37 | 4 | 8/8/2012 | 2:20 | 2% LEL | 20.7% | | 4.2% | | LOW FLOW |
| SP-38 | 4 | 8/8/2012 | 2:25 | LF | | | | | LOW FLOW |

INSTRUMENT CALIBRATION RECORD

DATE: 8/8/12___ TIME: ____7:20___ INT: ___DR___

DATE:__________ TIME: __________ INT: _______

DATE: __________ TIME: __________ INT: _______

WATER ENCOUNTERED? (Y) (N) DEPTH: ___________

REFUSAL? (Y) (N) DEPTH: ___________

COMMENTS:

# GAS MONITORING LOG

METHANE SPECIALISTS

PROJECT ADDRESS: Parcel 44 (Admiralty Way and Mindinao))

JOB NUMBER: J2602B

REASON FOR TESTING::

- X OIL WELL(S) NEARBY
- ☐ METHANE ZONE
- ☐ BUFFER ZONE
- ☐ LANDFILL
- ☐ FORMER LIVESTOCK AREA
- ☐ CONTAMINATED SITE

TESTER: DR

INSTRUMENT: RKI EAGLE

| PROBE | DEPTH FT. | DATE | TIME | CH4 % LEL | O2 % VOL | H2S PPM | CO/CO2 % VOL | GAS PRESS. IN. - H2O | PEAK READINGS |
|---|---|---|---|---|---|---|---|---|---|
| SP-39 | 4 | 8/8/2012 | 2:32 | ND | 19.7% | <0.1 | 4.0% | <0.1 | |
| SP-40 | 4 | 8/8/2012 | 2:47 | 16% LEL | 20.8% | <0.1 | 20.0% | <0.1 | |
| SP-41 | 4 | 8/8/2012 | 2:52 | ND | 20.9% | <0.1 | 10.7% | <0.1 | |
| SP-42 | 4 | 8/8/2012 | 3:00 | ND | 20.9% | <0.1 | 8.0% | <0.1 | |
| SP-43 | 4 | 8/8/2012 | 3:05 | 1% LEL | 17.4% | <0.1 | 13.1% | <0.1 | |
| SP-44 | 4 | 8/8/2012 | 3:15 | 6% LEL | 0.4% | <0.1 | 20.0% | <0.1 | |
| SP-45 | 4 | 8/8/2012 | 3:20 | LF | | | | | LOW FLOW |

INSTRUMENT CALIBRATION RECORD

DATE: 8/8/12___ TIME: ___7:20___ INT: ___DR___

DATE:__________ TIME: __________ INT: ________

DATE: __________ TIME: __________ INT: ________

WATER ENCOUNTERD? (Y) (N) DEPTH: __________

REFUSAL? (Y) (N) DEPTH: __________

COMMENTS:

**Approved Geologic Review Sheet and Soils Engineering Review Sheet**

Dist. Office ______

Sheet 1 of 1

**County of Los Angeles Department of Public Works**
**GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION**
**GEOLOGIC REVIEW SHEET**
**900 So. Fremont Ave., Alhambra, CA 91803**
**TEL. (626) 458-4925**

DISTRIBUTION
1 Dist. Office
__ Geologist
1 Soils Engineer
1 GMED File
__ LDD - Grading

| | | | |
|---|---|---|---|
| **Tract / Parcel Map** | | **Lot(s)** | |
| **Parent Tract** | | **Location** | Marina Del Rey |
| **Site Address** | 13443 Bali Way and 13650 Mindanao Way* | **APN** | 4224-008-901 & 4224-010-900 |
| **Geologist** | --- | **Developer/Owner** | LA County Dept. of Beaches and Harbors |
| **Soils Engineer** | Group Delta Consultants | **Engineer/Arch.** | Breen Engineering, Inc. |

CUP No. 201300166 For: Pier 44 redevelopment.

Geologic Report(s) Dated

Soils Engineering Report(s) Dated 6/16/14, 5/15/14, 3/11/14, 6/1/12

Geology and Soils Engineering Report(s) Dated

Additional Reports Reviewed

**Remarks/Conditions:**

The Soils Engineering review dated 7/15/14 is attached.

Prepared by ______ Reviewed by ______ Date 7 July 2014

Ricardo Lopez-Maldonado Charles Nestle

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey

P:\Gmepub\Geology Review\Forms\Form06.doc
2/13/08

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

## SOILS ENGINEERING REVIEW SHEET

| | | | |
|---|---|---|---|
| Address: | 900 S. Fremont Ave., Alhambra, CA 91803 | District Office | n/a |
| Telephone: | (626) 458-4925 | PCA | LX000135 |
| Fax: | (626) 458-4913 | Sheet 1 of 1 | |

DISTRIBUTION:
___ Drainage
___ Grading
1 Geo/Soils Central File
1 District Engineer
___ Geologist
1 Soils Engineer
1 Engineer/Architect

Redevelopment of Parcel 44 in Marina del Rey

| | |
|---|---|
| Location | Marina del Rey – Parcel 44 |
| Developer/Owner | Los Angeles County Department of Beaches and Harbors |
| Engineer/Architect | --- |
| Soils Engineer | Group Delta Consultants |
| Geologist | --- |

Conditional Use Permit No. 201300166

Review of:

Soils Engineering Report Dated **6/16/14**, 5/15/14, 3/11/14, 6/1/12
Previous Review Sheet Dated 5/28/14

REMARK:

At the grading/building plan stage, submit two sets of plans to the Soils Section for verification of compliance with County codes and policies.

REGISTERED PROFESSIONAL ENGINEER
ERICK DEL BOSQUE
NO. 76607
EXP: 12/31/14
CIVIL
STATE OF CALIFORNIA

Prepared by Erick del Bosque Date 7/15/14

**Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey.**

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

# APPENDIX 4.6

## Drainage Concept

BREEN
Engineering Inc

1983 West 190th Street, Suite 200
Torrance, Ca. 90504
**Tel:** 310-464-8404 ◆ **Fax:** 310-464-8408
www.breeneng.com

# DRAINAGE CONCEPT
**for**
**PARCEL 44**
**at**
**MARINA DEL REY**
**COUNTY OF LOS ANGELES**

BEI PROJECT #187-07-003C

CUP 201300166

REGISTERED PROFESSIONAL ENGINEER
SARAH K. CURRAN
No. 69620
Exp. 06-30-16
CIVIL
STATE OF CALIFORNIA

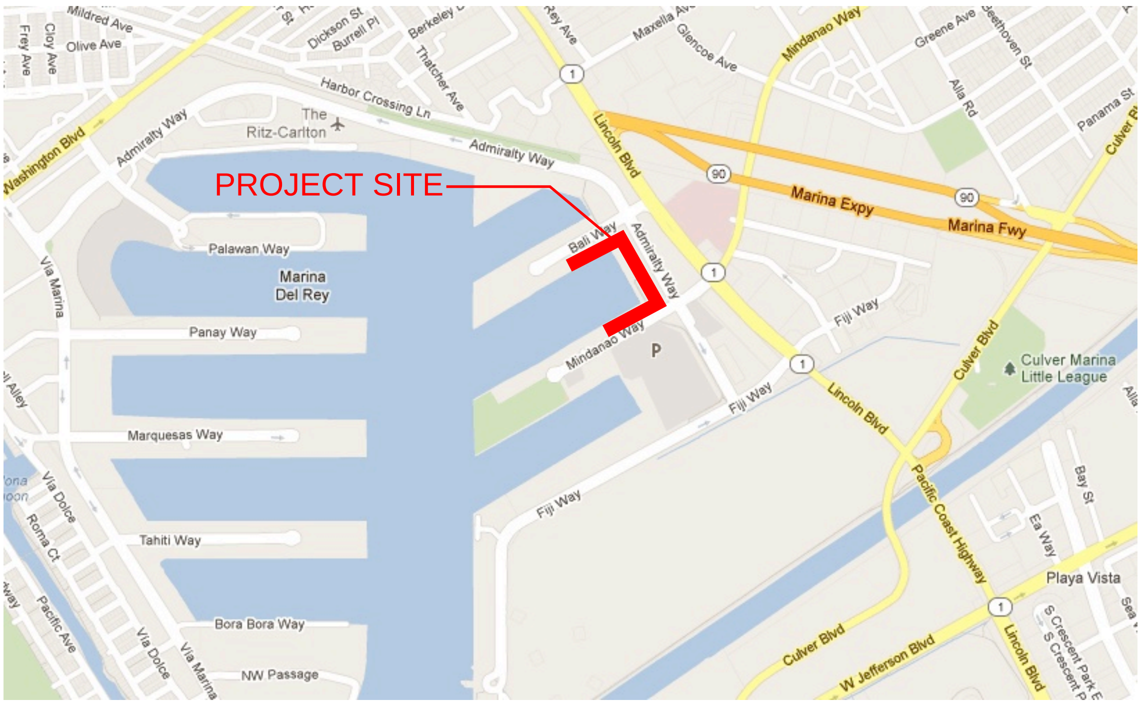
SARAH K. CURRAN R.C.E. 69620

Date: June 13th, 2014

# 1.0 INTRODUCTION

## 1.1 GEOGRAPHIC SETTING

The project area is 8.40 acres and is located in the Marina Del Rey area of Unincorporated Los Angeles County. The project is located on Admiralty Way, between Bali Way and Mindanao Way.




## 1.2 PURPOSE OF THIS REPORT

The purpose of this report is to accomplish the following:

- Demonstrate a drainage solution which will provide suitable flood protection for the proposed structures and prevent any diversions or impacts to adjacent public and private properties.
- Provide Q25 urban flood peak discharge rates per the 2006 County of Los Angeles Public Works Hydrology Manual
- Provide peak mitigated discharge rates per the County of Los Angeles Public Works MS4 Permit requirements and per Los Angeles County LID Manual.
- Support preparation of the environmental assessment.

1.3 REFERENCES

- Los Angeles County 2006 Hydrology Manual
- Los Angeles County TC Calculator
- Los Angeles County MS4 Permit
- Los Angeles County LID Manual

# 2.0 EXISTING TOPOGRAPHIC AND HYROLOGIC CONDITIONS

The existing site is currently developed for boat and vehicle parking, and includes six small office structures. The site is currently 94% impervious. Planters currently surround the perimeter of the site and are spread throughout the parking lot. The entire site sheet flows towards the marina where it is diverted to catch basins along the sea wall. There is no form of pre-treatment or storage for the existing site runoff conditions. The grated catch basins along the sea wall collect water and are diverted to a 60-in reinforced concrete pipe storm drain, which enters the site at the east corner between Admiralty Way and Mindanao Way and exits through the sea wall. The 60-in RCP is owned and maintained by the County of Los Angeles Flood Control District. (Per CDR 433.007)

# 3.0 PROPOSED STORM DRAIN FACILITIES

The existing site structures will be demolished. The new commercial development will consist of a grocery store, 2 retail/restaurant combination store locations, a 2-story office building, yacht club, and 3 public restooms. A new boat yard and launching platform will be located on the northwest portion of the site. New surface parking lots will also be provided throughout the site. A new promenade will accommodate a bicycle path and pedestrian walk and will be located adjacent to the sea wall.

New catch basins and storm drains on site will collect and convey stormwater away from structures. Two single connections to the 60” LA County storm drain are proposed. One of the connections will be coming from the north part of the site to accommodate the drainage from the north/northeast part of the site; the other connection is for the southern portion of the site. All other drains will convey runoff through the sea wall, utilizing the pre-construction design methods for drainage.

Groundwater in this location is tide dependent and during exploration it was observed to be between elevations of +2 to -3 MSL. Additionally, historical groundwater information indicates that the groundwater table has been as high as +5.0 MSL, which is less than 3ft below finished grade. According to the County of Los Angeles, Low Impact Development Standards Manual (LID), January 2009, the design requirements state “infiltration (onsite) may not be possible in all development scenarios. Exceptions may include, ‘where seasonal high ground water is within 10 feet of surface,'" (for LID Compliance see below). Therefore, on-site infiltration is not a feasible option at this site.

As required by the LID design requirements, the next stormwater management option is storage and reuse. The proposed new development will not have an adequate amount of landscaping to support a storage and reuse system, therefore making this option infeasible.

The last method of LID design requires the site to manage stormwater through water conservation use. LID BMPs that percolate runoff through engineered soil and allow it to discharge downstream slowly shall be implemented. Two forms of BMP's will be implemented to meet this requirement: planted paving surface with stormwater subbase and flow through planters. The site is graded to sheet flow runoff to the planted pavement, where it will be treated through biofiltration, then infiltrate to the stormwater sub-base, lined with an impermeable liner. The remaining site will divert runoff to catchbasins and roof drains throughout the site, where it will be collected and diverted to the flow through planters, lined with an impermeable liner, to be treated through bio-filtration. This will allow for stormwater detention and an achievable discharge rate. Treated runoff will slowly be released to the existing 60" RCP County storm drain that runs through the site.

This is the only feasible option for stormwater management.

# 4.0 HYDROLOGY STUDY

## 4.1 STORM FREQUENCY

The urban flood ($Q_{25}$) storm frequency is a sizing guideline that was used to determine the hydrologic capacity of all onsite storm drain systems. See TC Calculator results for each sub-area in Appendix 2.

## 4.2 METHODOLOGY

The $Q_{25}$ was determined using the Los Angeles County Public Works TC Calculator and 2006 Hydrology Manual. The existing site was divided up into 4 separate sub-areas to determine the peak discharge rate for the existing condition. The developed site condition was separated into 5 similar main sub-areas dependent on proposed grading and stormwater treatment locations. See Drainage Concept Map, Exhibit A, in Appendix 3.

The 85th percentile storm water quality design volume (SWQDv) was used to determine the runoff volumes for the proposed development.

4.3 RESULTS

| EXISTING DRAINAGE SUB - AREA | AREA (ACRES) | $T_C$ (MIN.) | $V_M$ ($FT^3$) | $Q_{25}$ (CFS) |
|---|---|---|---|---|
| 1 | 2.48 | 5 | - | 5.88 |
| 2 | 4.27 | 5 | - | 10.45 |
| 3 | 0.77 | 5 | - | 1.88 |
| 4 | 0.95 | 5 | - | 2.33 |
| | Σ A = **8.47** | | | Σ ($Q_{25}$) = **20.5** |

| PROPOSED DRAINAGE SUB-AREA | AREA (ACRES) | $T_C$ (MIN.) | SWQDv ($FT^3$) | $Q_{25}$ (CFS) |
|---|---|---|---|---|
| 1 | 1.89 | 5 | 6,079 | 4.63 |
| 2 | 1.20 | 5 | 3,738 | 2.94 |
| 3 | 1.84 | 5 | 6,093 | 4.50 |
| 4 | 2.01 | 5 | 6,401 | 4.92 |
| 5 | 1.53 | 5 | 4,920 | 3.75 |
| | Σ A = **8.47** | | Σ(SWQDv)= **27,231** | Σ ($Q_{25}$) = **20.7** |

# 5.0 SIZING OF BMPS

5.1 METHODOLOGY

All BMPs will be sized to treat 1-1/2 times the 85th percentile storm water quality design (SWQDv) of rainfall for the post-developed condition as described in the LID Manual.

# 6.0 SIZING OF CATCH BASINS

6.1 METHODOLOGY

All proposed and existing catch basin upgrades will be sized based on the LA County Hydrology Manual's Q25.

# 7.0 CONCLUSION

Since the existing site was previously developed and mostly impervious, the proposed development will not result in a runoff increase. New BMP's will treat and mitigated runoff from the site and will be in accordance with the new LA County MS4 Permit requirements.

In closing, site drainage can and will be managed such that surrounding properties and marine environments will not be adversely affected by the development. This will be accomplished while meeting all County, State and Federal statutes and ordinances.

# 8.0 APPENDICES

| | |
|---|---|
| Appendix 1 | 85th Percentile Volume Based BMPs |
| Appendix 2 | $Q_{25}$ Hydrology Study |
| Appendix 3 | Existing and Developed Site Drainage Map |
| Appendix 4 | Preliminary Grading Plan |

# Appendix 1 85th Percentile Volume Based BMPs

Department of Public Works
dpw.lacounty.gov

search our site...

## Hydrology Map
A GIS viewer application to view the data for the hydrology manual.

LAYERS

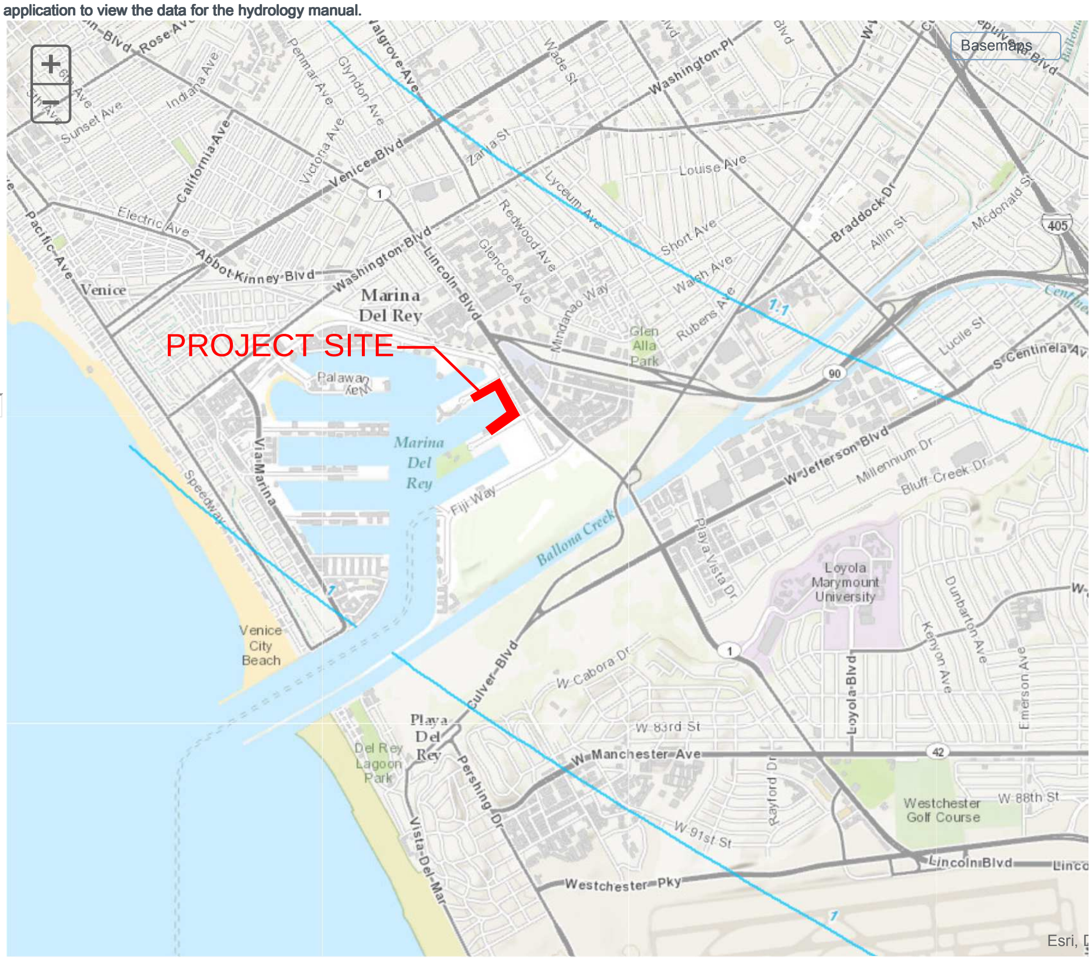
- 50yr Two Tenths (Rainfall)
- DPA Zones
- Soils 2004
- TG Page
- ☑ Final 85th Percentile, 24-hr Rainfall
- 1-year, 1-hour Rainfall Intensity

SEARCH

Zoom to TG Page:

Enter Address, Cross Street, or Parcel No.:
(ex: 900 S. Fremont Ave., Fremont@Valley, 5342005904)

Search




Map Tips

# Peak Flow Hydrologic Analysis

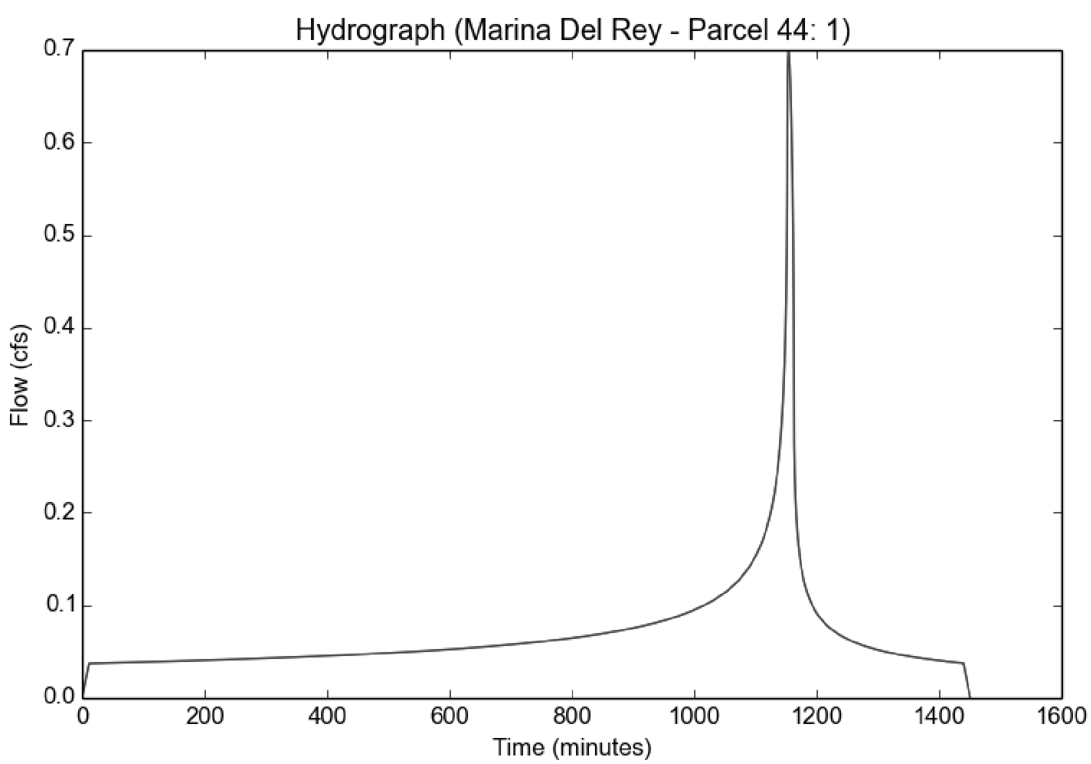
File location: H:/Projects/187 Gold Coast Villag, LLC/-07-003C-Parcel 44/Docs/Calculations and Reports/Drainage Concept/hydo-calc.pdf
Version: HydroCalc 0.2.0-beta

## Input Parameters

| | |
|---|---|
| Project Name | Marina Del Rey - Parcel 44 |
| Subarea ID | 1 |
| Area (ac) | 1.89 |
| Flow Path Length (ft) | 150.0 |
| Flow Path Slope (vft/hft) | 0.01 |
| 85th Percentile Rainfall Depth (in) | 1.1 |
| Percent Impervious | 0.89 |
| Soil Type | 16 |
| Design Storm Frequency | 85th percentile storm |
| Fire Factor | 0 |
| LID | True |

## Output Results

| | |
|---|---|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.1 |
| Peak Intensity (in/hr) | 0.4531 |
| Undeveloped Runoff Coefficient (Cu) | 0.1483 |
| Developed Runoff Coefficient (Cd) | 0.8173 |
| Time of Concentration (min) | 11.0 |
| Clear Peak Flow Rate (cfs) | 0.6999 |
| Burned Peak Flow Rate (cfs) | 0.6999 |
| 24-Hr Clear Runoff Volume (ac-ft) | 0.1395 |
| 24-Hr Clear Runoff Volume (cu-ft) | 6078.7285 |



# Peak Flow Hydrologic Analysis

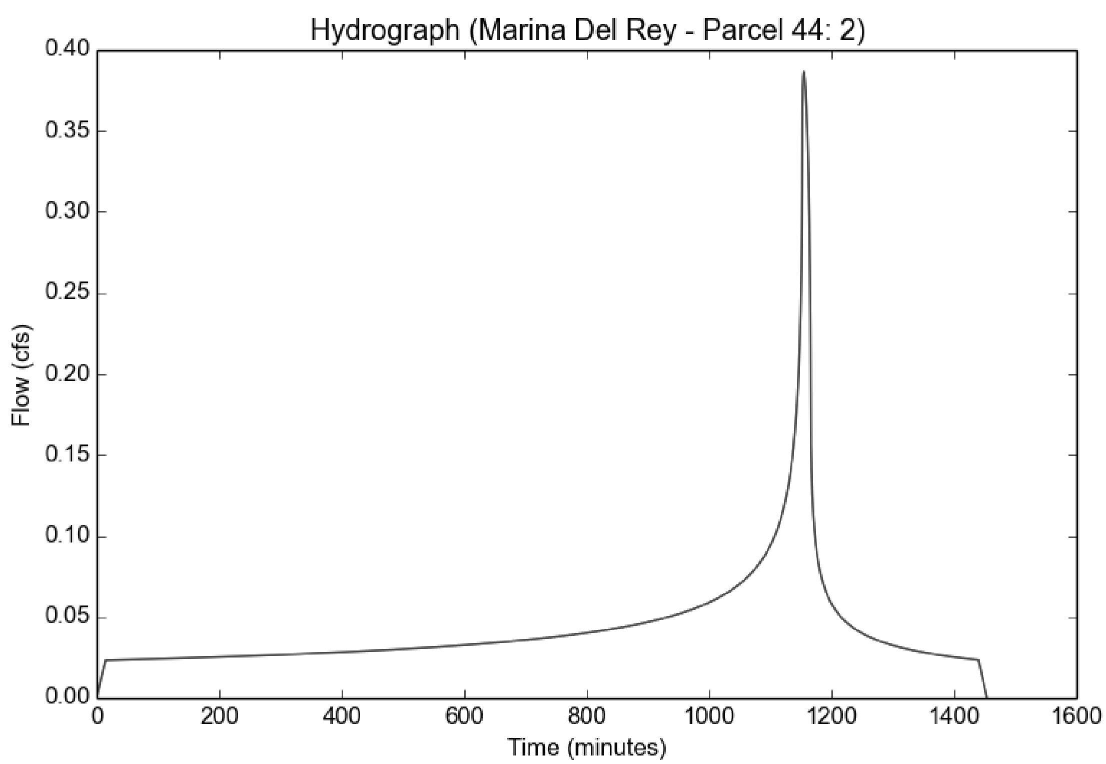
File location: H:/Projects/187 Gold Coast Villag, LLC/-07-003C-Parcel 44/Docs/Calculations and Reports/Drainage Concept/hydo-calc.pdf
Version: HydroCalc 0.2.0-beta

## Input Parameters

| | |
|---|---|
| Project Name | Marina Del Rey - Parcel 44 |
| Subarea ID | 2 |
| Area (ac) | 1.2 |
| Flow Path Length (ft) | 250.0 |
| Flow Path Slope (vft/hft) | 0.016 |
| 85th Percentile Rainfall Depth (in) | 1.1 |
| Percent Impervious | 0.87 |
| Soil Type | 16 |
| Design Storm Frequency | 85th percentile storm |
| Fire Factor | 0 |
| LID | True |

## Output Results

| | |
|---|---|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.1 |
| Peak Intensity (in/hr) | 0.4045 |
| Undeveloped Runoff Coefficient (Cu) | 0.1041 |
| Developed Runoff Coefficient (Cd) | 0.7965 |
| Time of Concentration (min) | 14.0 |
| Clear Peak Flow Rate (cfs) | 0.3866 |
| Burned Peak Flow Rate (cfs) | 0.3866 |
| 24-Hr Clear Runoff Volume (ac-ft) | 0.0868 |
| 24-Hr Clear Runoff Volume (cu-ft) | 3782.6357 |



# Peak Flow Hydrologic Analysis

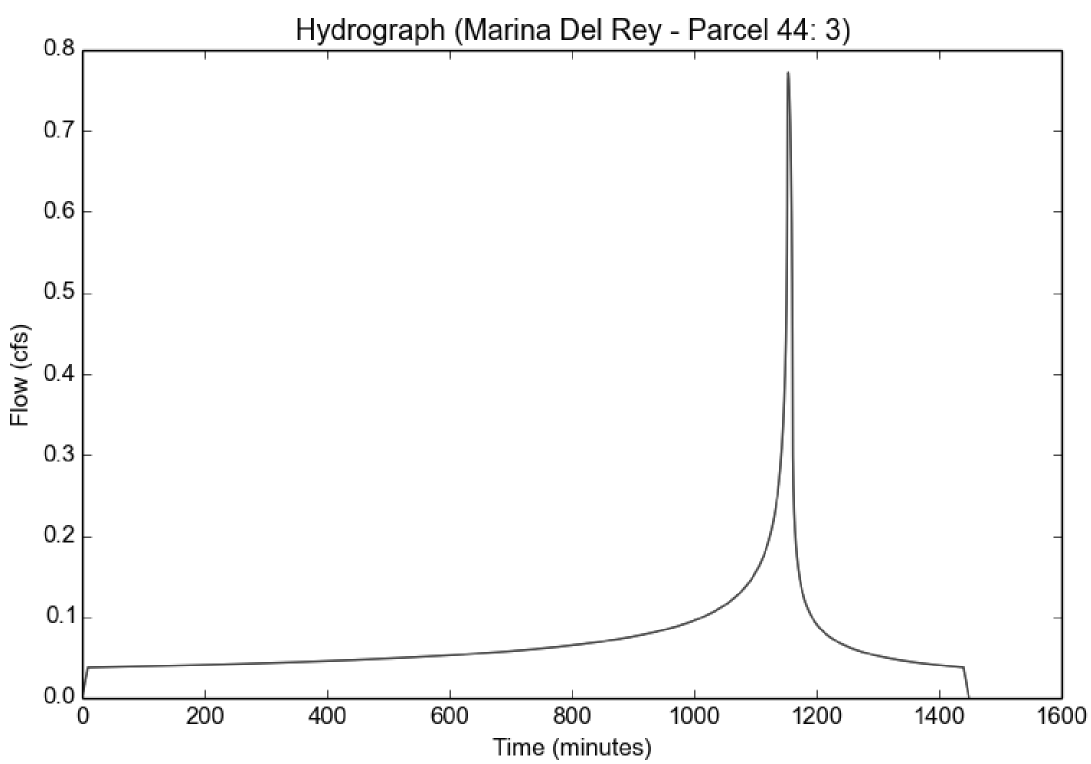
File location: H:/Projects/187 Gold Coast Villag, LLC/-07-003C-Parcel 44/Docs/Calculations and Reports/Drainage Concept/hydo-calc.pdf
Version: HydroCalc 0.2.0-beta

## Input Parameters

| | |
|---|---|
| Project Name | Marina Del Rey - Parcel 44 |
| Subarea ID | 3 |
| Area (ac) | 1.84 |
| Flow Path Length (ft) | 150.0 |
| Flow Path Slope (vft/hft) | 0.027 |
| 85th Percentile Rainfall Depth (in) | 1.1 |
| Percent Impervious | 0.92 |
| Soil Type | 16 |
| Design Storm Frequency | 85th percentile storm |
| Fire Factor | 0 |
| LID | True |

## Output Results

| | |
|---|---|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.1 |
| Peak Intensity (in/hr) | 0.4979 |
| Undeveloped Runoff Coefficient (Cu) | 0.189 |
| Developed Runoff Coefficient (Cd) | 0.8431 |
| Time of Concentration (min) | 9.0 |
| Clear Peak Flow Rate (cfs) | 0.7724 |
| Burned Peak Flow Rate (cfs) | 0.7724 |
| 24-Hr Clear Runoff Volume (ac-ft) | 0.1399 |
| 24-Hr Clear Runoff Volume (cu-ft) | 6093.4193 |



# Peak Flow Hydrologic Analysis

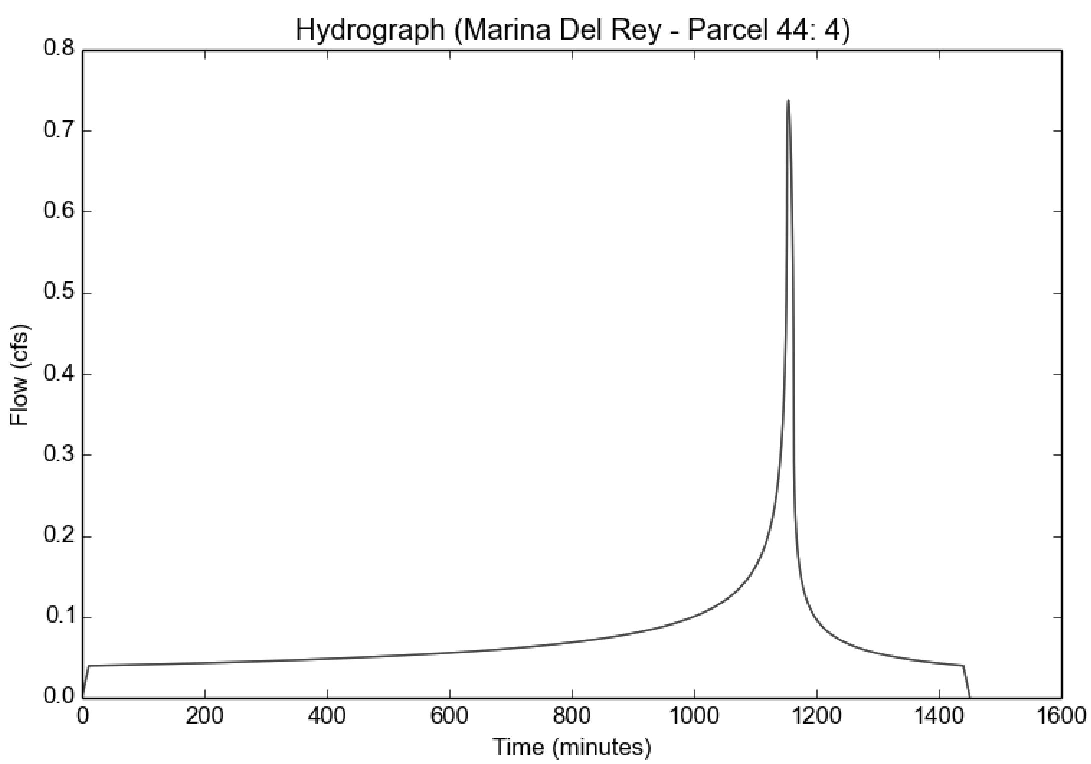
File location: H:/Projects/187 Gold Coast Villag, LLC/-07-003C-Parcel 44/Docs/Calculations and Reports/Drainage Concept/hydo-calc.pdf
Version: HydroCalc 0.2.0-beta

## Input Parameters

| | |
|---|---|
| Project Name | Marina Del Rey - Parcel 44 |
| Subarea ID | 4 |
| Area (ac) | 2.01 |
| Flow Path Length (ft) | 180.0 |
| Flow Path Slope (vft/hft) | 0.022 |
| 85th Percentile Rainfall Depth (in) | 1.1 |
| Percent Impervious | 0.88 |
| Soil Type | 16 |
| Design Storm Frequency | 85th percentile storm |
| Fire Factor | 0 |
| LID | True |

## Output Results

| | |
|---|---|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.1 |
| Peak Intensity (in/hr) | 0.4531 |
| Undeveloped Runoff Coefficient (Cu) | 0.1483 |
| Developed Runoff Coefficient (Cd) | 0.8098 |
| Time of Concentration (min) | 11.0 |
| Clear Peak Flow Rate (cfs) | 0.7374 |
| Burned Peak Flow Rate (cfs) | 0.7374 |
| 24-Hr Clear Runoff Volume (ac-ft) | 0.1469 |
| 24-Hr Clear Runoff Volume (cu-ft) | 6401.1367 |



# Peak Flow Hydrologic Analysis

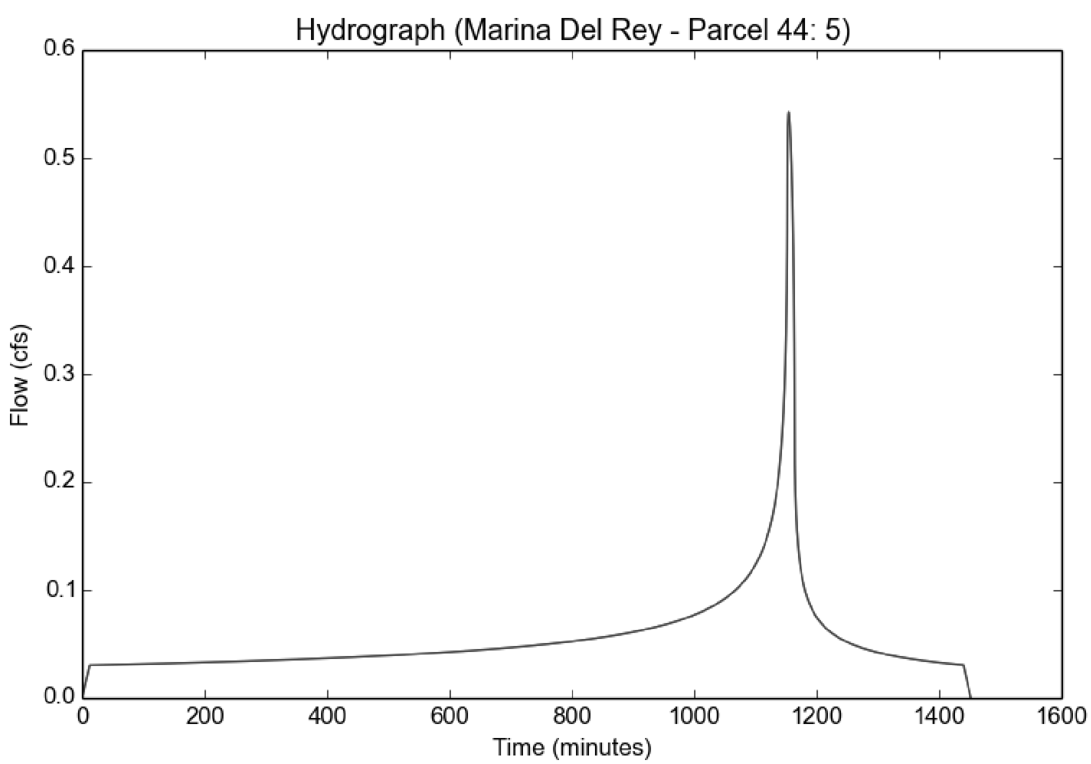
File location: H:/Projects/187 Gold Coast Villag, LLC/-07-003C-Parcel 44/Docs/Calculations and Reports/Drainage Concept/hydo-calc.pdf
Version: HydroCalc 0.2.0-beta

## Input Parameters

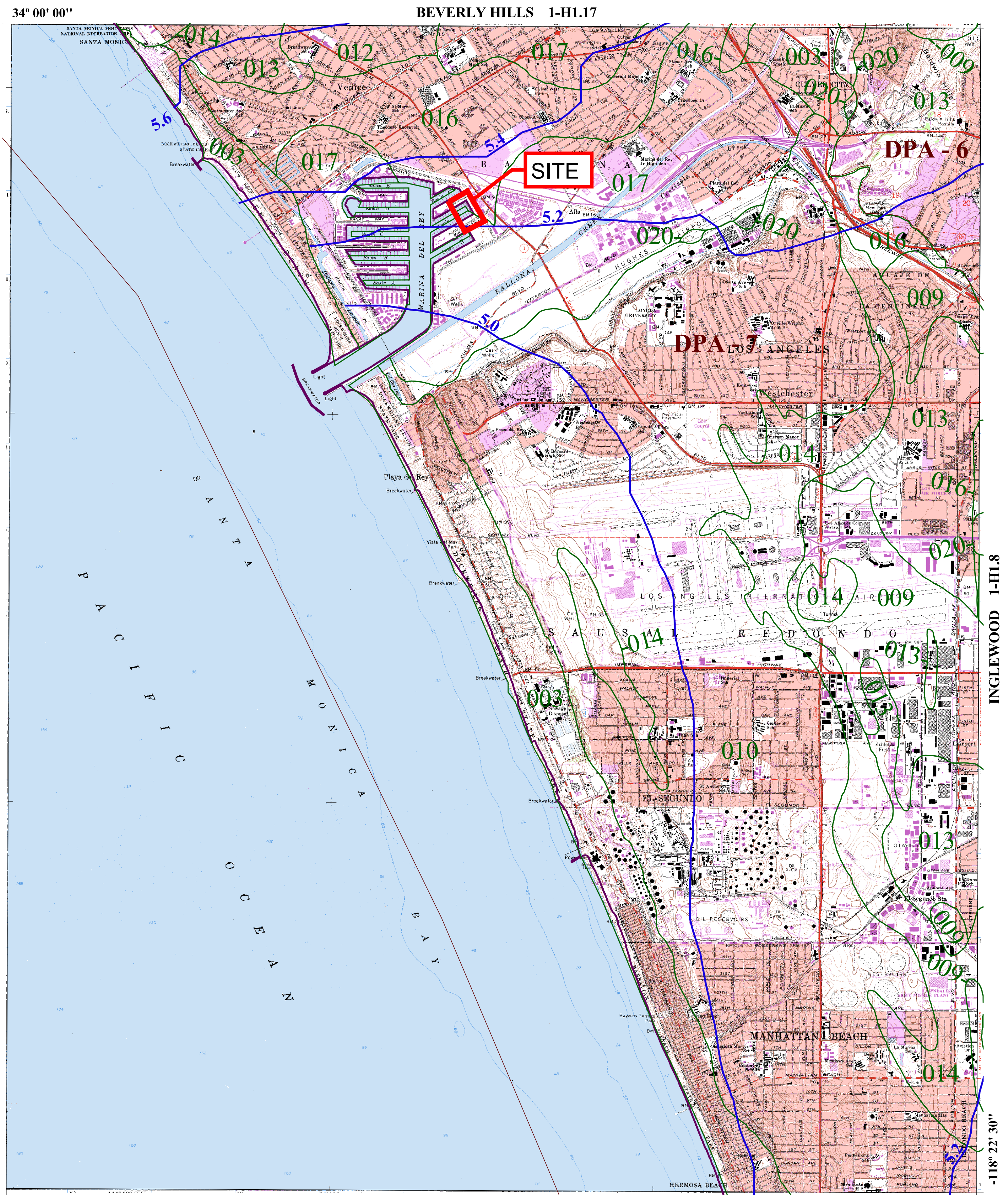
| | |
|---|---|
| Project Name | Marina Del Rey - Parcel 44 |
| Subarea ID | 5 |
| Area (ac) | 1.53 |
| Flow Path Length (ft) | 180.0 |
| Flow Path Slope (vft/hft) | 0.011 |
| 85th Percentile Rainfall Depth (in) | 1.1 |
| Percent Impervious | 0.89 |
| Soil Type | 16 |
| Design Storm Frequency | 85th percentile storm |
| Fire Factor | 0 |
| LID | True |

## Output Results

| | |
|---|---|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.1 |
| Peak Intensity (in/hr) | 0.4349 |
| Undeveloped Runoff Coefficient (Cu) | 0.1317 |
| Developed Runoff Coefficient (Cd) | 0.8155 |
| Time of Concentration (min) | 12.0 |
| Clear Peak Flow Rate (cfs) | 0.5426 |
| Burned Peak Flow Rate (cfs) | 0.5426 |
| 24-Hr Clear Runoff Volume (ac-ft) | 0.113 |
| 24-Hr Clear Runoff Volume (cu-ft) | 4920.4177 |



# Appendix 2 Q25 Hydrology Study




016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878

10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

# V E N I C E 1-H1.7

# 50-YEAR 24-HOUR ISOHYET

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

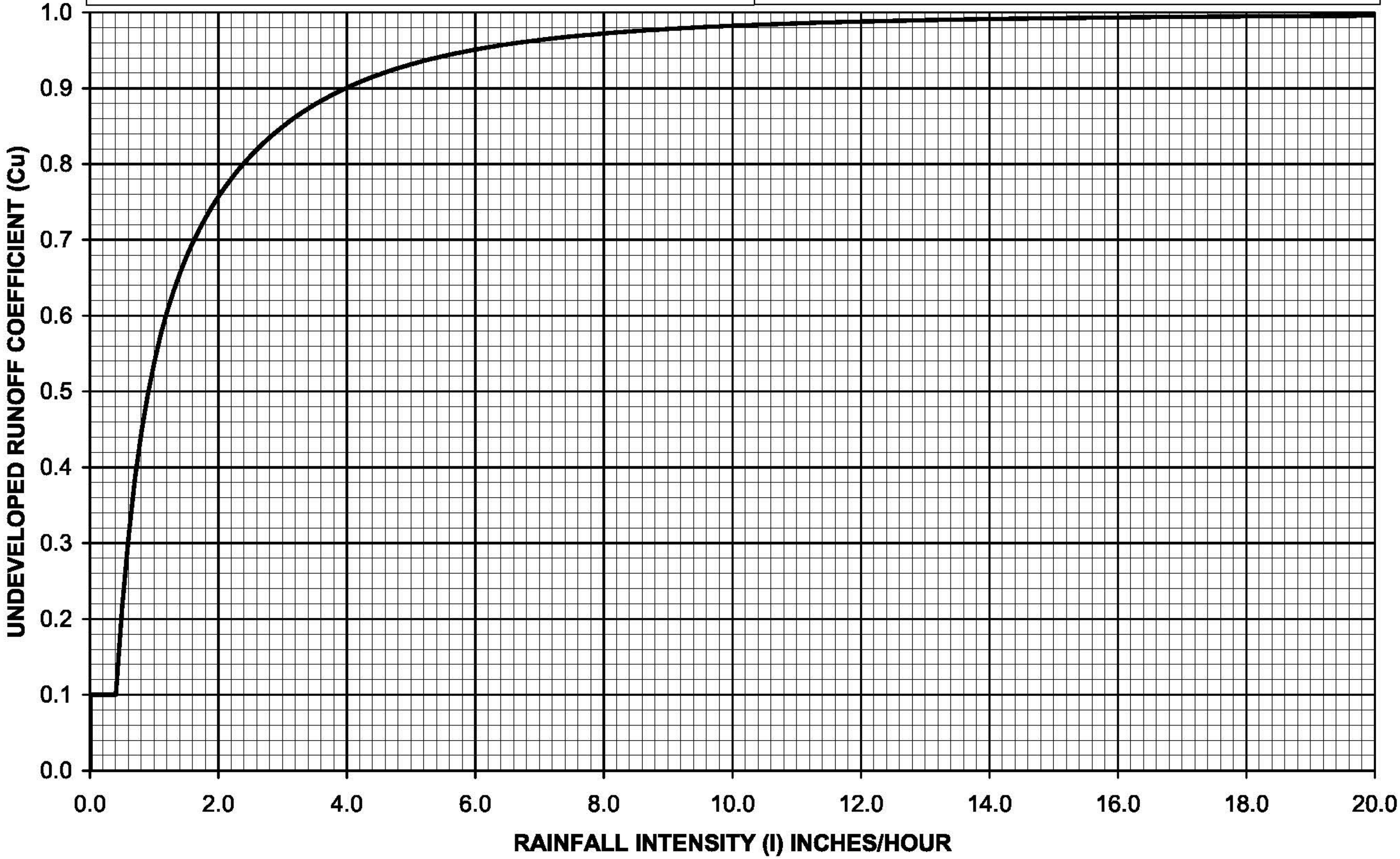
Where: $C_D$ = Developed Runoff Coefficient

IMP = Proportion Impervious

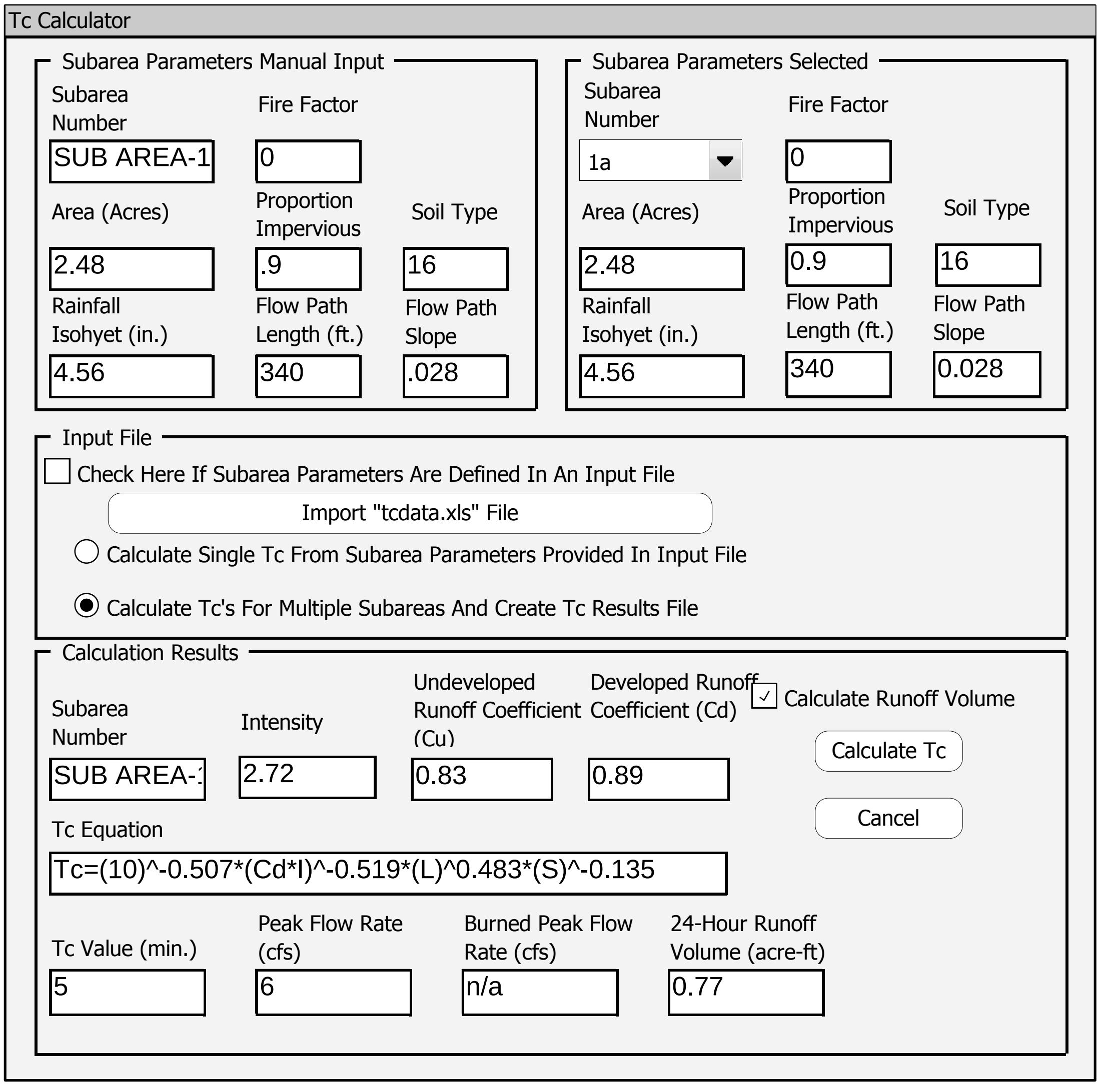
$C_U$ = Undeveloped runoff coefficient

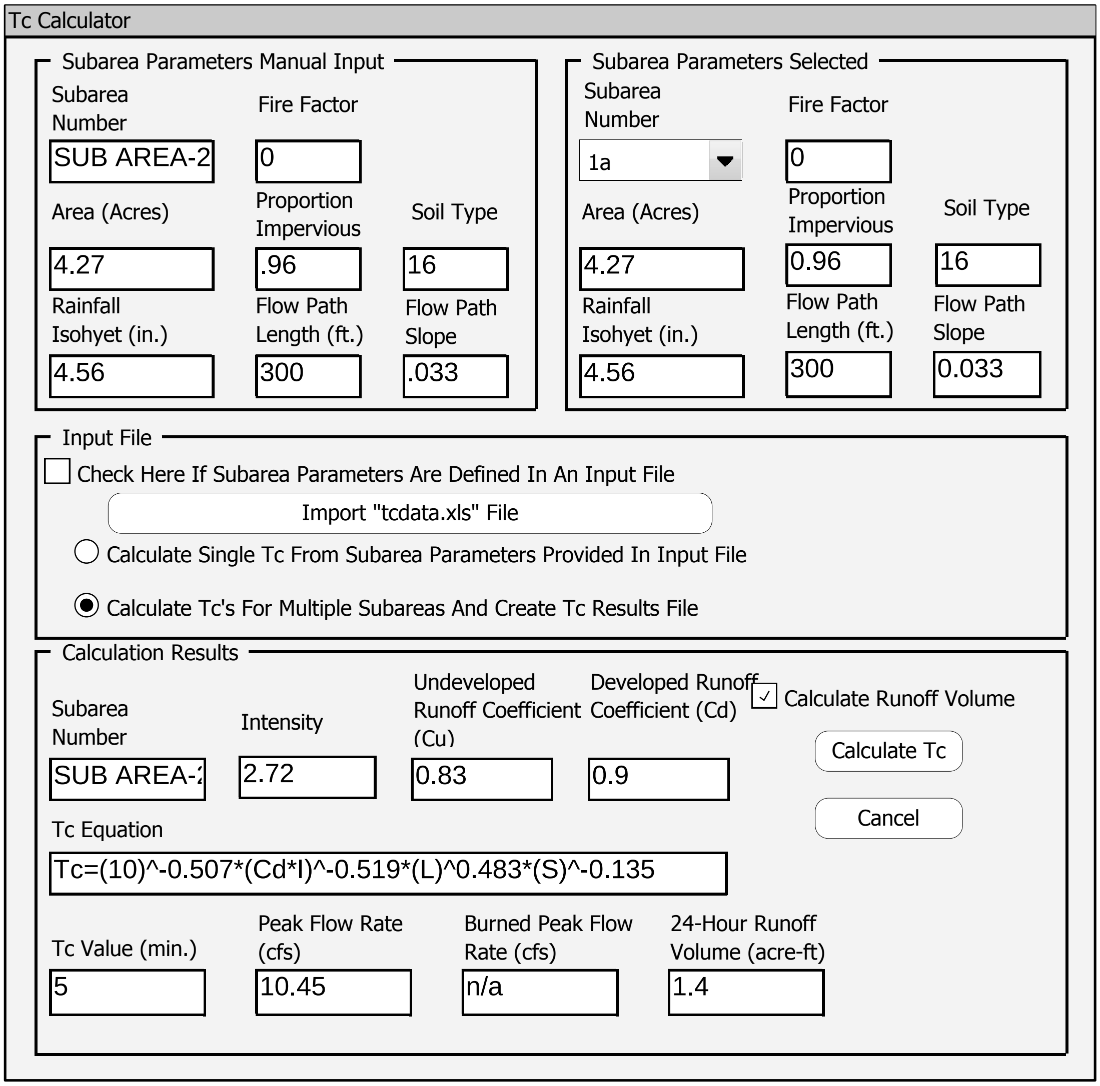
# Los Angeles County Department of Public Works

## RUNOFF COEFFICIENT CURVE
## SOIL TYPE NO. 016



# EXISTING SITE


Tc Calculator
Subarea Parameters Manual Input
Subarea Number
SUB AREA-1
Fire Factor
0
Area (Acres)
2.48
Proportion Impervious
.9
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
340
Flow Path Slope
.028
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
2.48
Proportion Impervious
0.9
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
340
Flow Path Slope
0.028
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
SUB AREA-1
Intensity
2.72
Undeveloped Runoff Coefficient (Cu)
0.83
Developed Runoff Coefficient (Cd)
0.89
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
6
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.77


Tc Calculator
Subarea Parameters Manual Input
Subarea Number
SUB AREA-2
Fire Factor
0
Area (Acres)
4.27
Proportion Impervious
.96
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
300
Flow Path Slope
.033
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
4.27
Proportion Impervious
0.96
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
300
Flow Path Slope
0.033
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
SUB AREA-2
Intensity
2.72
Undeveloped Runoff Coefficient (Cu)
0.83
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
10.45
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
1.4

**Tc Calculator**

**Subarea Parameters Manual Input**

| Field | Value |
|---|---|
| Subarea Number | SUB AREA-3 |
| Fire Factor | 0 |
| Area (Acres) | .77 |
| Proportion Impervious | .96 |
| Soil Type | 16 |
| Rainfall Isohyet (in.) | 4.56 |
| Flow Path Length (ft.) | 170 |
| Flow Path Slope | .057 |

**Subarea Parameters Selected**

| Field | Value |
|---|---|
| Subarea Number | 1a |
| Fire Factor | 0 |
| Area (Acres) | 0.77 |
| Proportion Impervious | 0.96 |
| Soil Type | 16 |
| Rainfall Isohyet (in.) | 4.56 |
| Flow Path Length (ft.) | 170 |
| Flow Path Slope | 0.057 |

**Input File**

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

**Calculation Results**

| Subarea Number | Intensity | Undeveloped Runoff Coefficient (Cu) | Developed Runoff Coefficient (Cd) |
|---|---|---|---|
| SUB AREA-3 | 2.72 | 0.83 | 0.9 |

☑ Calculate Runoff Volume

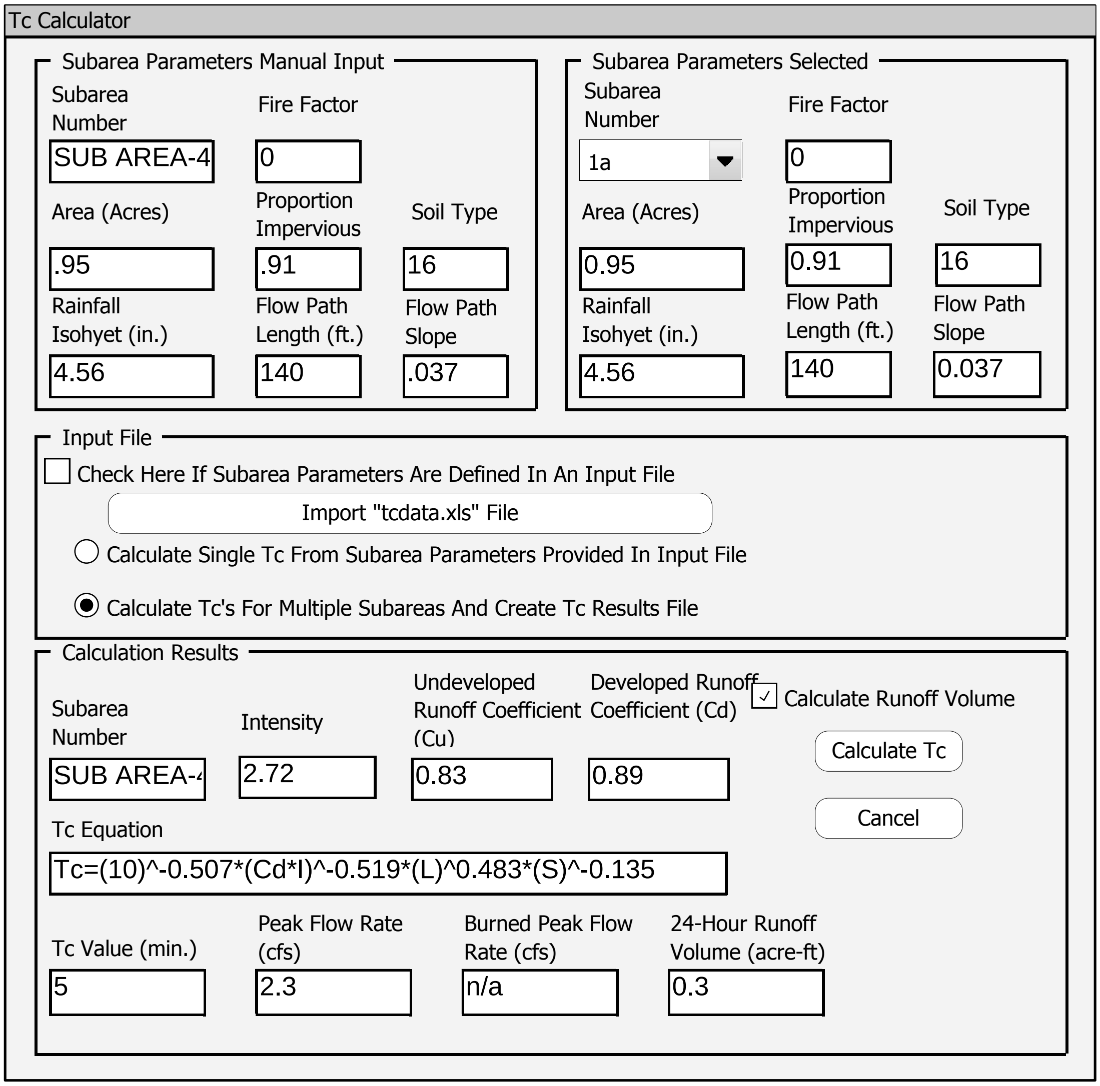
Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

| Tc Value (min.) | Peak Flow Rate (cfs) | Burned Peak Flow Rate (cfs) | 24-Hour Runoff Volume (acre-ft) |
|---|---|---|---|
| 5 | 1.88 | n/a | 0.25 |


Tc Calculator
Subarea Parameters Manual Input
Subarea Number
SUB AREA-4
Fire Factor
0
Area (Acres)
.95
Proportion Impervious
.91
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
140
Flow Path Slope
.037
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
0.95
Proportion Impervious
0.91
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
140
Flow Path Slope
0.037
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
SUB AREA-4
Intensity
2.72
Undeveloped Runoff Coefficient (Cu)
0.83
Developed Runoff Coefficient (Cd)
0.89
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
2.3
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.3

# PROPOSED SITE

Tc Calculator

**Subarea Parameters Manual Input**

| Field | Value |
|---|---|
| Subarea Number | SUB AREA-1 |
| Fire Factor | 0 |
| Area (Acres) | 1.89 |
| Proportion Impervious | .89 |
| Soil Type | 16 |
| Rainfall Isohyet (in.) | 4.56 |
| Flow Path Length (ft.) | 150 |
| Flow Path Slope | .01 |

**Subarea Parameters Selected**

| Field | Value |
|---|---|
| Subarea Number | 1a |
| Fire Factor | 0 |
| Area (Acres) | 1.89 |
| Proportion Impervious | 0.89 |
| Soil Type | 16 |
| Rainfall Isohyet (in.) | 4.56 |
| Flow Path Length (ft.) | 150 |
| Flow Path Slope | 0.01 |

**Input File**

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

**Calculation Results**

| Subarea Number | Intensity | Undeveloped Runoff Coefficient (Cu) | Developed Runoff Coefficient (Cd) |
|---|---|---|---|
| SUB AREA-1 | 2.72 | 0.83 | 0.89 |

☑ Calculate Runoff Volume

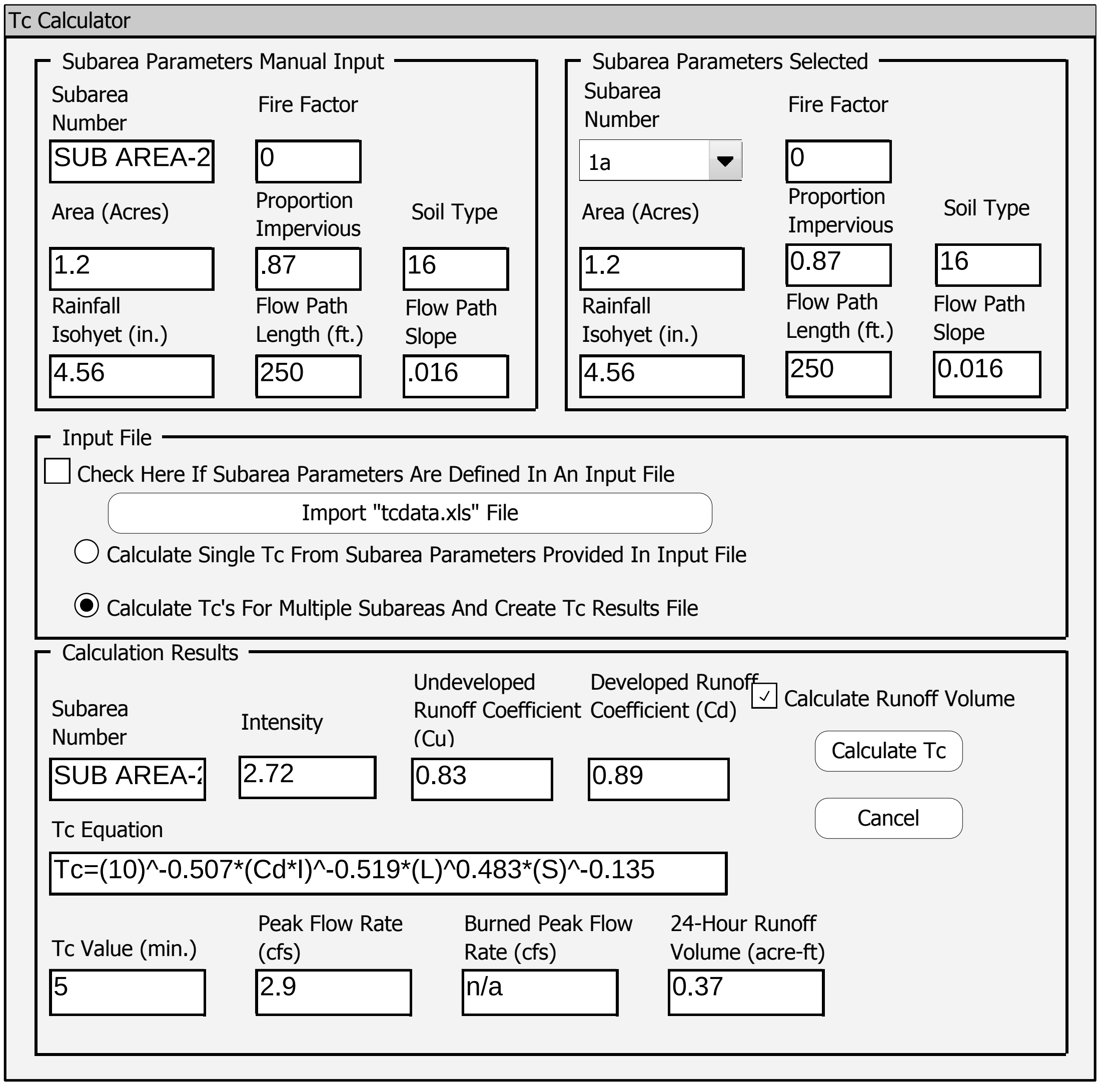
Calculate Tc

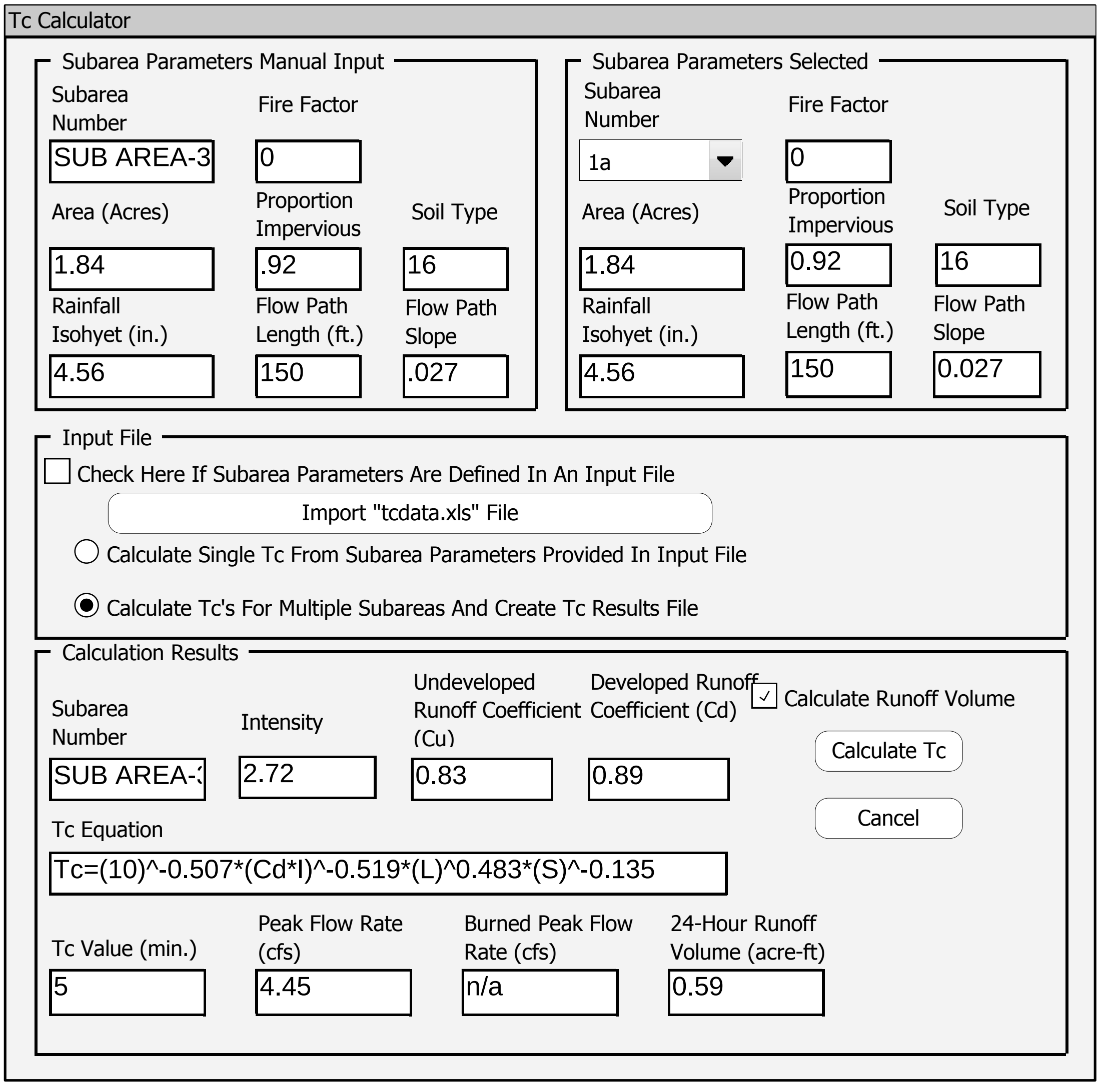
Cancel

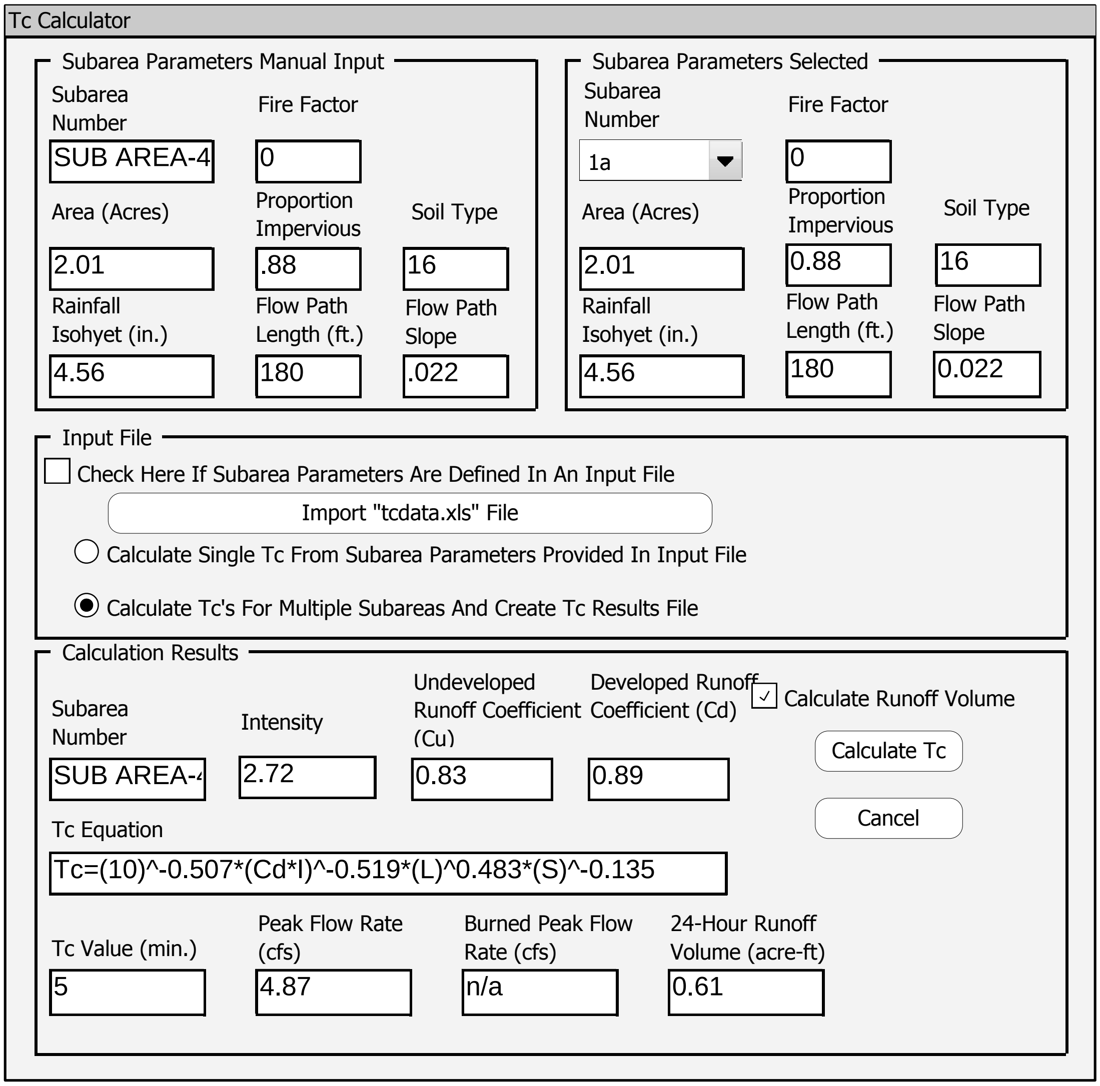
Tc Equation

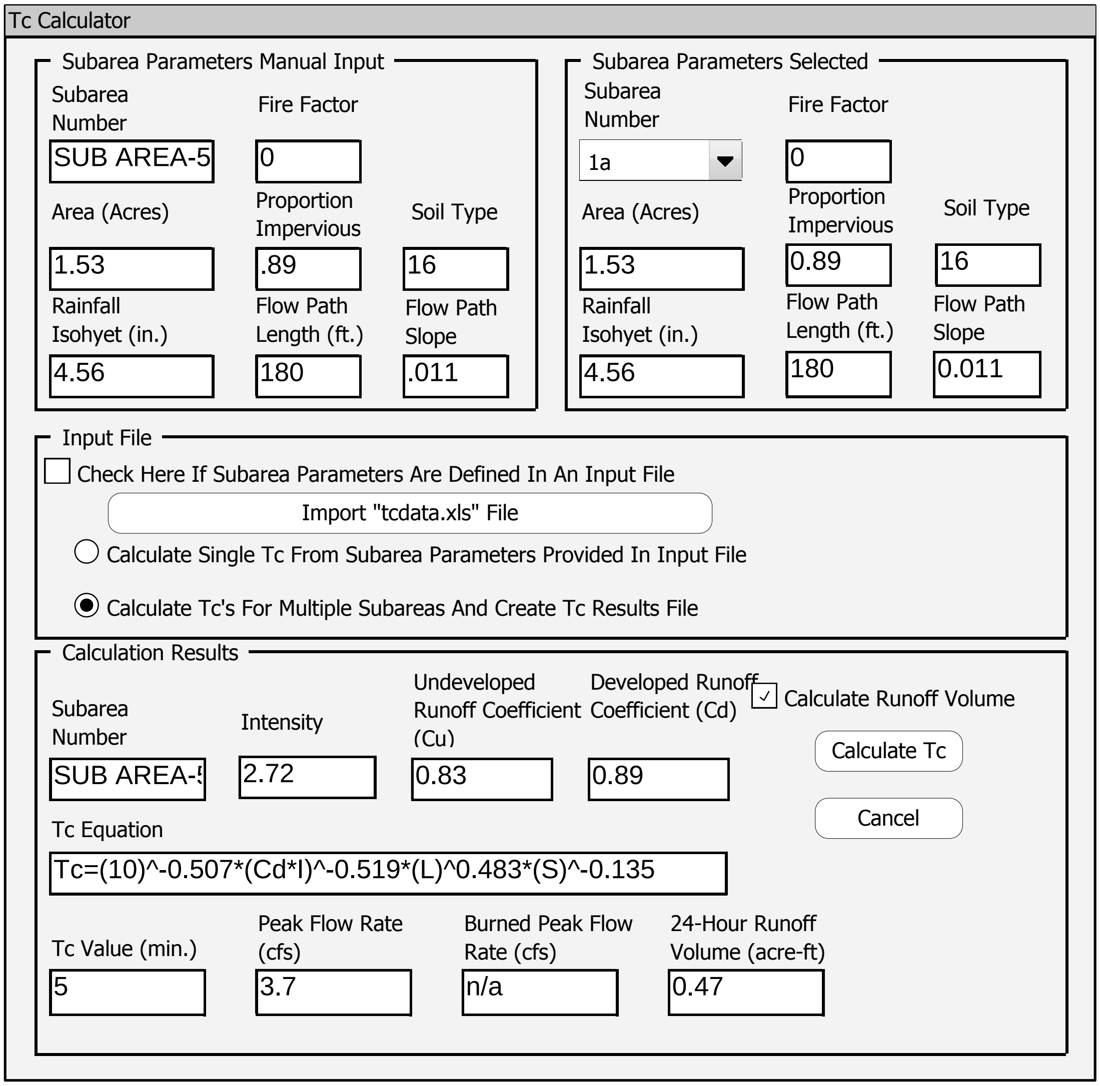
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

| Tc Value (min.) | Peak Flow Rate (cfs) | Burned Peak Flow Rate (cfs) | 24-Hour Runoff Volume (acre-ft) |
|---|---|---|---|
| 5 | 4.58 | n/a | 0.58 |

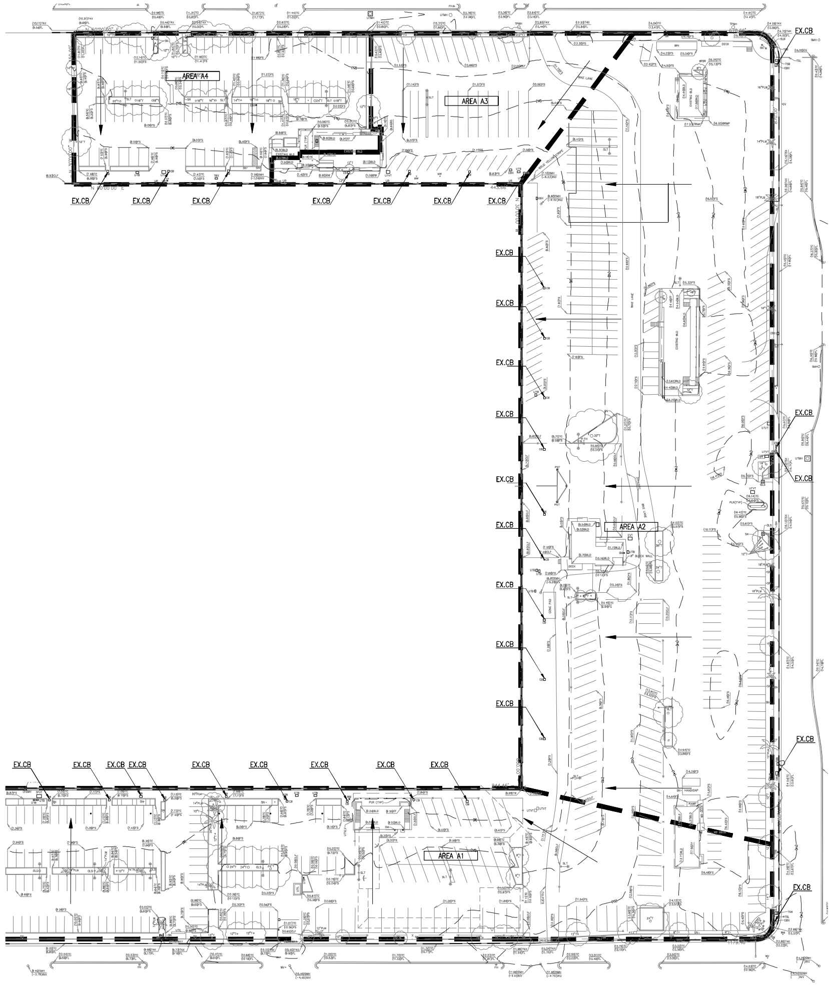

Tc Calculator
Subarea Parameters Manual Input
Subarea Number
Fire Factor
SUB AREA-2
0
Area (Acres)
Proportion Impervious
Soil Type
1.2
.87
16
Rainfall Isohyet (in.)
Flow Path Length (ft.)
Flow Path Slope
4.56
250
.016
Subarea Parameters Selected
Subarea Number
Fire Factor
1a
0
Area (Acres)
Proportion Impervious
Soil Type
1.2
0.87
16
Rainfall Isohyet (in.)
Flow Path Length (ft.)
Flow Path Slope
4.56
250
0.016
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
Intensity
Undeveloped Runoff Coefficient (Cu)
Developed Runoff Coefficient (Cd)
Calculate Runoff Volume
SUB AREA-2
2.72
0.83
0.89
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
Peak Flow Rate (cfs)
Burned Peak Flow Rate (cfs)
24-Hour Runoff Volume (acre-ft)
5
2.9
n/a
0.37


Tc Calculator
Subarea Parameters Manual Input
Subarea Number
Fire Factor
SUB AREA-3
0
Area (Acres)
Proportion Impervious
Soil Type
1.84
.92
16
Rainfall Isohyet (in.)
Flow Path Length (ft.)
Flow Path Slope
4.56
150
.027
Subarea Parameters Selected
Subarea Number
Fire Factor
1a
0
Area (Acres)
Proportion Impervious
Soil Type
1.84
0.92
16
Rainfall Isohyet (in.)
Flow Path Length (ft.)
Flow Path Slope
4.56
150
0.027
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
Intensity
Undeveloped Runoff Coefficient (Cu)
Developed Runoff Coefficient (Cd)
Calculate Runoff Volume
SUB AREA-3
2.72
0.83
0.89
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
Peak Flow Rate (cfs)
Burned Peak Flow Rate (cfs)
24-Hour Runoff Volume (acre-ft)
5
4.45
n/a
0.59

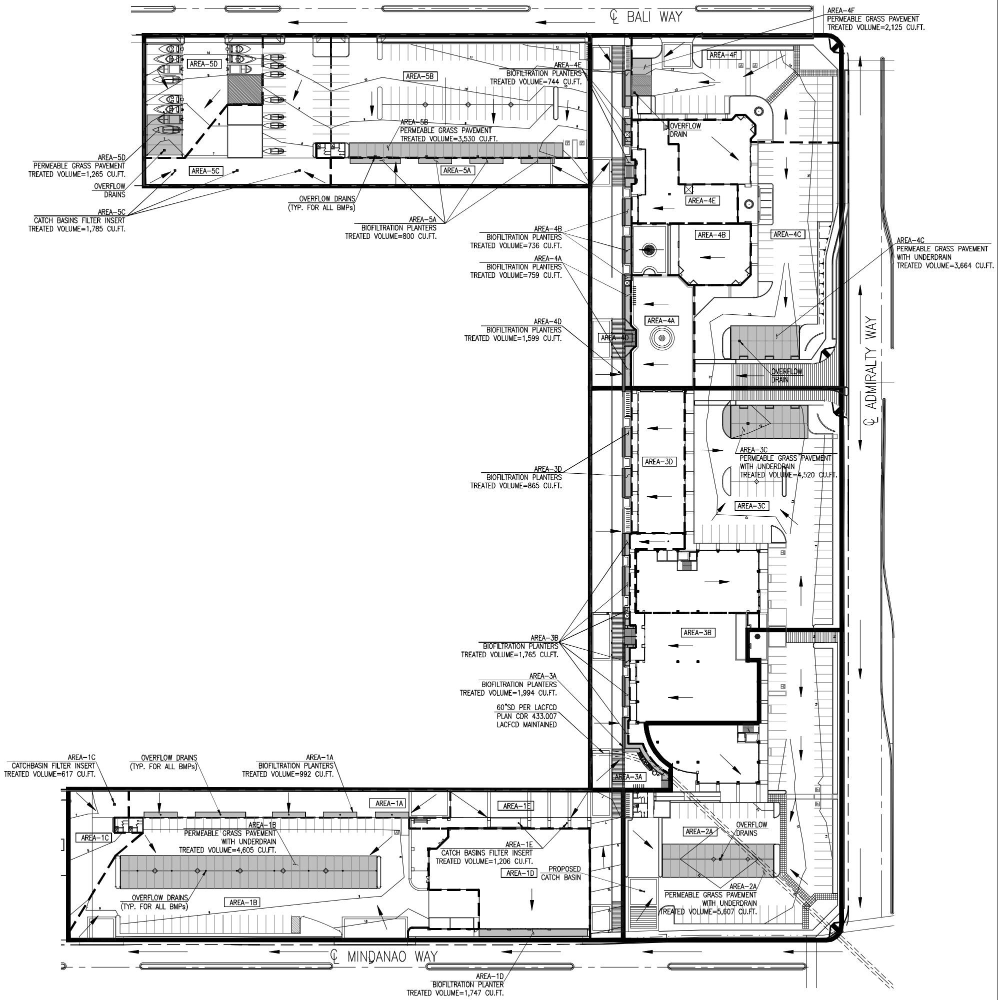

Tc Calculator
Subarea Parameters Manual Input
Subarea Number
SUB AREA-4
Fire Factor
0
Area (Acres)
2.01
Proportion Impervious
.88
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
180
Flow Path Slope
.022
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
2.01
Proportion Impervious
0.88
Soil Type
16
Rainfall Isohyet (in.)
4.56
Flow Path Length (ft.)
180
Flow Path Slope
0.022
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
SUB AREA-4
Intensity
2.72
Undeveloped Runoff Coefficient (Cu)
0.83
Developed Runoff Coefficient (Cd)
0.89
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
4.87
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.61


Tc Calculator
Subarea Parameters Manual Input
Subarea Number
Fire Factor
SUB AREA-5
0
Area (Acres)
Proportion Impervious
Soil Type
1.53
.89
16
Rainfall Isohyet (in.)
Flow Path Length (ft.)
Flow Path Slope
4.56
180
.011
Subarea Parameters Selected
Subarea Number
Fire Factor
1a
0
Area (Acres)
Proportion Impervious
Soil Type
1.53
0.89
16
Rainfall Isohyet (in.)
Flow Path Length (ft.)
Flow Path Slope
4.56
180
0.011
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
Intensity
Undeveloped Runoff Coefficient (Cu)
Developed Runoff Coefficient (Cd)
Calculate Runoff Volume
SUB AREA-!
2.72
0.83
0.89
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
Peak Flow Rate (cfs)
Burned Peak Flow Rate (cfs)
24-Hour Runoff Volume (acre-ft)
5
3.7
n/a
0.47

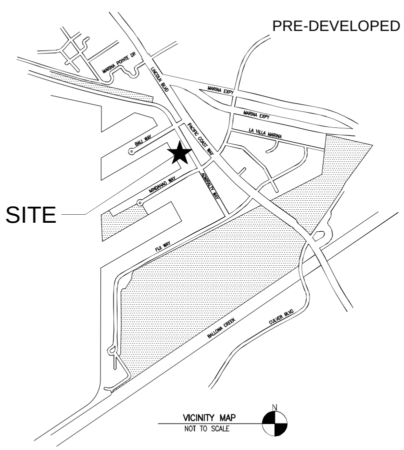
# Appendix 3 Existing and Developed Site Drainage Map




PRE-DEVELOPED CONDITIONS




POST DEVELOPED CONDITIONS




VICINITY MAP
NOT TO SCALE

LEGEND:

- TREATMENT AREA. BIO-PLANTERS/GRASSCRETE
- AREA-XY — EXISTING/ PROPOSED DRAINAGE AREA AND SUB-AREA I.D.
- EXISTING DRAINAGE AREA
- PROPOSED SUB AREA BOUNDARY
- FLOW DIRECTION
- PROPOSED DRAINAGE AREA

GENERAL NOTE:

ALL EXISTING AND NEW ONSITE DRAINAGE FACILITIES SHALL BE MAINTAINED BY LEASE HOLDER UNLESS OTHERWISE CALLED OUT ON PLAN.

DRAINAGE CONCEPT NOTES:

1. COMPLIANCE OF ALL STREET DRAINAGE REQUIREMENTS WILL BE MET TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS.
2. ACCESS WILL BE PROVIDED TO ALL INLETS AND OUTLETS TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS.
3. NECESSARY EASEMENTS WILL BE DEDICATED FOR THE STORM DRAIN SYSTEM TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS.
4. HYDROLOGY INFORMATION AND STORM DRAIN ALIGNMENTS SHOWN ARE NOT NECESSARILY APPROVED.
5. A NOTE OF FLOOD HAZARD WILL BE REQUIRED WHERE INDICATED ON THIS PLAN.

THE FOLLOWING BMP'S MAY BE USED TO SATISFY SUSMP REQUIREMENTS:

1. INSERT FILTERS IN CATCH BASINS AND STORM DRAINS INLETS.
2. STENCILING CATCH BASIN AND STORM DRAIN INLETS WITH PROHIBITIVE LANGUAGE (SUCH AS: "NO DUMPING – DRAINS TO OCEAN" AND/OR GRAPHICAL ICON TO DISCOURAGE ILLEGAL DUMPING.
3. REGULAR SWEEPING OF STREETS IN THE PROPOSED DEVELOPMENT.
4. PROVIDE TRASH CANS AND RECYCLING RECEPTACLES ALONG PEDESTRIAN WALKWAYS.
5. POST SIGNS AND PROHIBITIVE LANGUAGE AND/OR GRAPHICAL ICON TO DISCOURAGE ILLEGAL DUMPING.
6. UTILIZE NON–TOXIC PESTICIDES AND FERTILIZERS IN THE LANDSCAPING AREAS OF THE PROJECT.
7. PROVIDE OWNERS AND RENTERS WITH INFORMATIVE AND BROCHURES OUTLINING GOOD HOUSEKEEPING PRACTICES FOR THE USE AND DISPOSE OF HOUSEHOLD PRODUCTS. ENCOURAGE THE USE OF NON–HAZARDOUS CLEANING SUBSTANCES AND TO RECYCLE UNWANTED HOUSEHOLD HAZARDOUS MATERIALS INTO A COUNTYWIDE HOUSEHOLD HAZARDOUS COLLECTION CENTER.

HYDROLOGIC DESIGN PARAMETERS FOR 85TH PERCENTILE STORM SIZE

PROJECT DESIGN STORM: 85TH PERCENTILE
SOIL TYPE: 16
85TH PERCENTILE RAINFALL DEPTH: 1.1 INCH

HYDROLOGIC DESIGN DATA

| SUB–AREA | AREA (ACRES) | LENGTH (FT) | SLOPE (FT/FT) | PERCENT IMPERVIOUSNESS | DEVELOPED RUNOFF COEFFICIENT(Cd) | SWQDv (CU.FT) | TIME OF CONCENTRATION (MIN.) | *SQWDv(1.5) (CU.FT) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.89 | 150 | 0.01 | 0.89 | 0.8173 | 6,079 | 11 | 9,120 |
| 2 | 1.20 | 250 | 0.016 | 0.87 | 0.7965 | 3,738 | 14 | 5,607 |
| 3 | 1.84 | 150 | 0.027 | 0.92 | 0.8431 | 6,093 | 9 | 9,144 |
| 4 | 2.01 | 180 | 0.022 | 0.88 | 0.8098 | 6,401 | 11 | 9,602 |
| 5 | 1.53 | 180 | 0.011 | 0.89 | 0.8155 | 4,920 | 12 | 7,380 |
| | ΣAREA=8.47 | | | | | ΣVM=27,231 | | (1.5)ΣVM=40,847 |

* A COMBINATION OF PERMEABLE GRASS PAVEMENTS, BIOFILTRATION PLANTERS, AND CATCH BASIN FILTER INSERTS WILL MITIGATE THE STORMWATER QUALITY DESIGN VOLUME(SWQDv) BY 1.5 TIMES OR MORE. SEE PLAN FOR BMP TYPE AND TREATMENT QUANTITIES.

0' 25' 50' 100'
GRAPHIC SCALE:1"=50'

REV. | DESCRIPTION | DATE | BY

JON M. ZIEGLER R.C.E. 18802

BREEN Engineering Inc
1983 WEST 190TH STREET, SUITE 200
TORRANCE, CA 90504
TEL: (310) 464-8404
FAX: (310) 464-8408
WWW.BREENENG.COM

DRAINAGE CONCEPT FOR CUP 2013 001 66

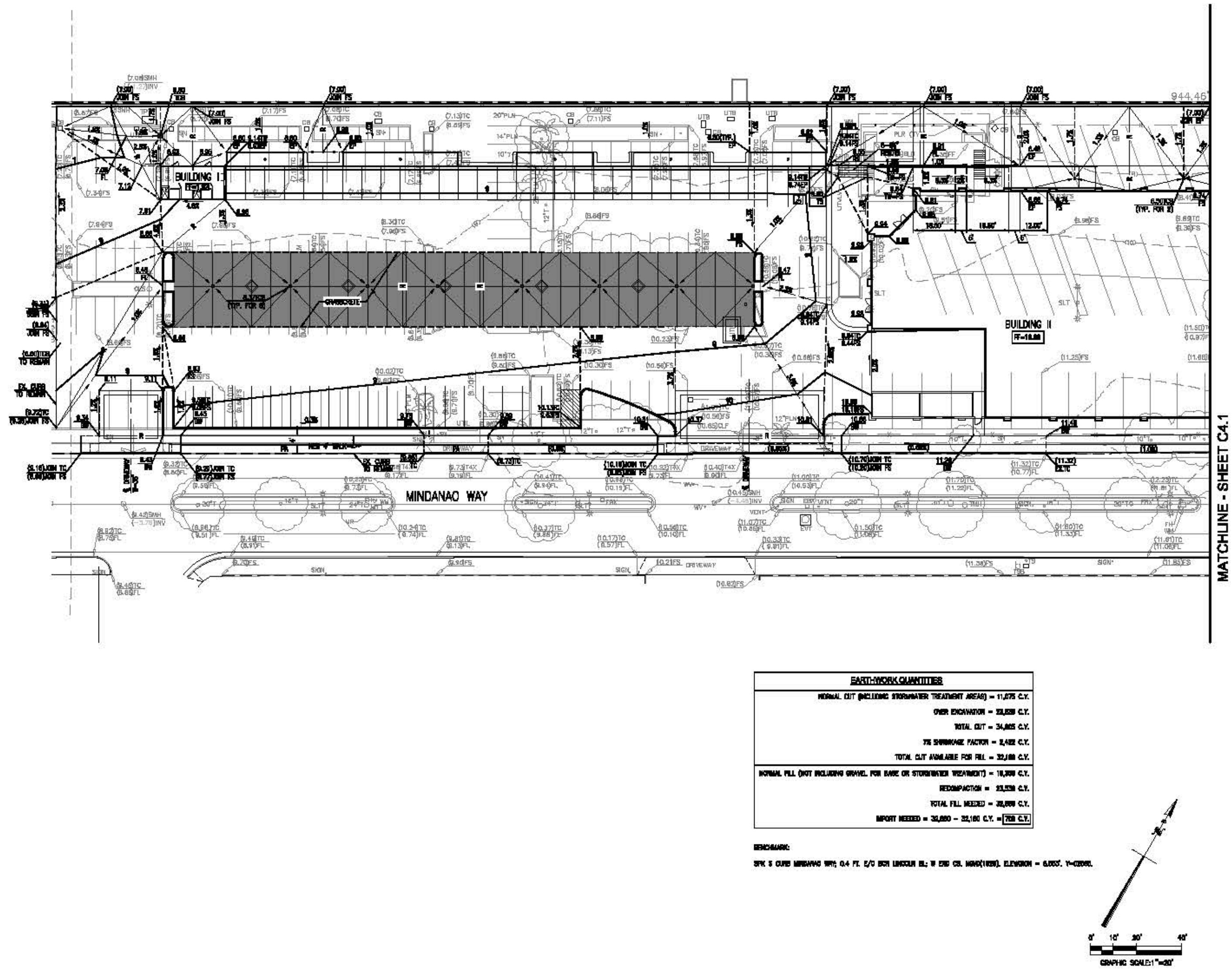
# MARINA DEL REY PARCEL -44

ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

DATE: 11/05/13
SCALE:
PROJECT NUMBER: 1B7-11-001C
DRAWN BY: ET,MP
CHECKED BY: JZ
DRAWING NUMBER

EXHIBIT-A

# Appendix 4 Preliminary Grading Plan




| EARTHWORK QUANTITIES |
| --- |
| NORMAL CUT (INCLUDING STORMWATER TREATMENT AREAS) = 11,075 C.Y. |
| OVER EXCAVATION = 23,529 C.Y. |
| TOTAL CUT = 34,605 C.Y. |
| 7% SHRINKAGE FACTOR = 2,422 C.Y. |
| TOTAL CUT AVAILABLE FOR FILL = 32,180 C.Y. |
| NORMAL FILL (NOT INCLUDING GRAVEL FOR BASE OR STORMWATER TREATMENT) = 10,350 C.Y. |
| RECOMPACTION = 23,530 C.Y. |
| TOTAL FILL NEEDED = 32,880 C.Y. |
| IMPORT NEEDED = 32,880 – 32,180 C.Y. = 700 C.Y. |

BENCHMARK:

SPK S CURB MINDANAO WAY; 0.4 FT. E/O BCR LINCOLN BL; W END CB. MGMD(1939). ELEVATION = 6.003'. Y=03060.

REV. | DESCRIPTION | DATE | BY

JON M. ZIEGLER R.C.E. 18802

BREEN Engineering Inc
1983 WEST 190TH STREET, SUITE 200
TORRANCE, CA 90504
TEL: (310) 464-8404
FAX: (310) 464-8408
WWW.BREENENG.COM

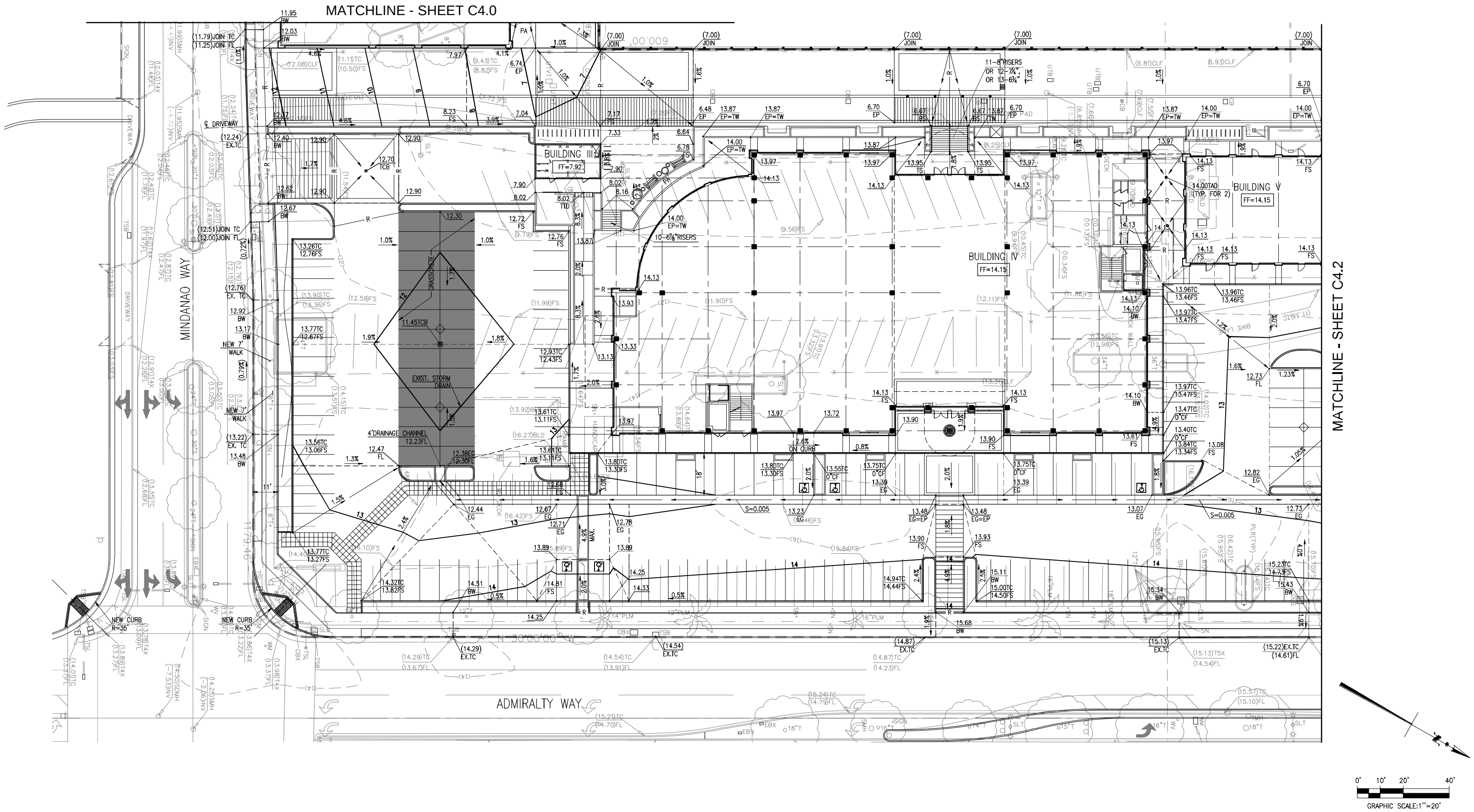
FINISH GRADING PLAN

# MARINA DEL REY PARCEL -44

ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

| | |
| --- | --- |
| DATE: | 11/05/13 |
| SCALE: | 1"=20' |
| PROJECT NUMBER: | 187-11-0010 |
| DRAWN BY: | ET/NP |
| CHECKED BY: | JZ |
| DRAWING NUMBER: | |

C4.0




REV. | DESCRIPTION | DATE | BY

JON M. ZIEGLER R.C.E. 18802

1983 WEST 190TH STREET, SUITE 200
TORRANCE, CA 90504
TEL: (310) 464-8404
FAX: (310) 464-8408
WWW.BREENENG.COM

BREEN Engineering Inc

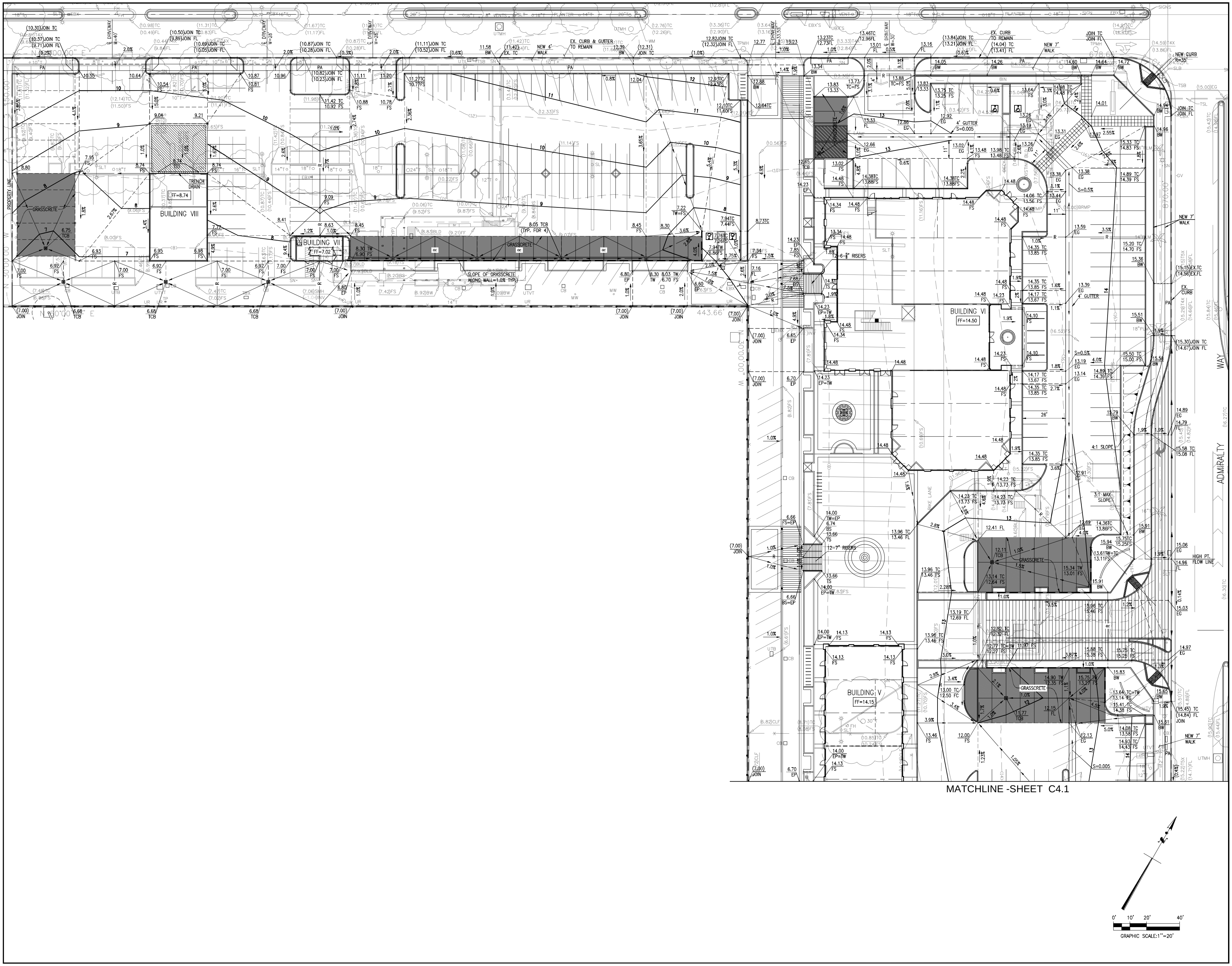
FINISH GRADING PLAN

# MARINA DEL REY PARCEL -44

ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

| | |
|---|---|
| DATE: | 11/05/13 |
| SCALE: | 1"=20' |
| PROJECT NUMBER: | 187-11-001C |
| DRAWN BY: | EF,MP |
| CHECKED BY: | JZ |
| DRAWING NUMBER | |

C4.1




JON M. ZIEGLER R.C.E. 18802

1983 WEST 190TH STREET, SUITE 200
TORRANCE, CA 90504
TEL: (310) 464-8404
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BREEN Engineering Inc

FINISH GRADING PLAN

# MARINA DEL REY PARCEL -44

ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

| | |
|---|---|
| DATE: | 11/05/13 |
| SCALE: | 1"=20' |
| PROJECT NUMBER: | 187-11-001C |
| DRAWN BY: | EF,MP |
| CHECKED BY: | JZ |
| DRAWING NUMBER | |

C4.2

# APPENDIX 4.7

## Noise Monitoring Study

*NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes*

| ROADWAY NAME Segment | Land Use | Lanes | Median Width | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor | Alpha Factor (1) | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks |
|---|---|---|---|---|---|---|---|---|---|---|
| *Lincoln n/o Venice* | | | | | | | | | | |
| Existing 2010 | | 6 | 0 | 18,717 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| *Lincoln s/o Venice* | | | | | | | | | | |
| Existing 2010 | | 6 | 0 | 19,817 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 6 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| *Venice e/o Lincoln* | | | | | | | | | | |
| Existing 2010 | | 7 | 0 | 14,982 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 7 | 0 | 0 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 7 | 0 | 0 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 7 | 0 | 0 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 7 | 0 | 0 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 7 | 0 | 0 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 7 | 0 | 0 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| *Venice w/o Lincoln* | | | | | | | | | | |
| Existing 2010 | | 7 | 0 | 12,672 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 7 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 7 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 7 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 7 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 7 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 7 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |

*(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.*

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

2

*NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes*

| ROADWAY NAME Segment | Land Use | Lanes | Median Width | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor | Alpha Factor (1) | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks |
|---|---|---|---|---|---|---|---|---|---|---|
| *Pacific n/o Washington* | | | | | | | | | | |
| Existing 2010 | | 4 | 0 | 7,101 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| *Pacific s/o Washington* | | | | | | | | | | |
| Existing 2010 | | 4 | 0 | 2,186 | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 4 | 0 | | 40 | 75 | 0 | 0 | 1.8% | 0.7% |
| *Washington e/o Pacific* | | | | | | | | | | |
| Existing 2010 | | 4 | 0 | 8,118 | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| *Washington w/o Pacific* | | | | | | | | | | |
| Existing 2010 | | 4 | 0 | 963 | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/OP | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2020 W/P | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 1 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 1 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/OP - 2 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |
| 2030 W/P - 2 | | 4 | 0 | | 45 | 75 | 0 | 0 | 1.8% | 0.7% |

*(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.*

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

*2*

*NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes*

| *ROADWAY NAME Segment* | *Land Use* | *Lanes* | *Median Width* | *ADT Volume* | *Design Speed (mph)* | *)ist. from Center tc Recepto* | *Alpha Factor (1* | *Barrier Attn. dB(A)* | *Vehicle Mix Medium Trucks* | *Heavy Trucks* |
|---|---|---|---|---|---|---|---|---|---|---|
| *Via Dolce n/o Washington* | | | | | | | | | | |
| Existing 2010 | | *4* | *0* | *655* | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/OP | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/P | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| *Via Dolce s/o Washington* | | | | | | | | | | |
| Existing 2010 | | *4* | *0* | *2,622* | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/OP | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/P | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| *Washington e/o Via Dolce* | | | | | *4* | | | | | |
| Existing 2010 | | *4* | *0* | *8,993* | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/OP | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/P | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| *Washington w/o Via Dolce* | | | | | | | | | | |
| Existing 2010 | | *4* | *0* | *8,371* | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/OP | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2020 W/P | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 1 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/OP - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |
| 2030 W/P - 2 | | *4* | *0* | | *40* | *75* | *0* | *0* | *1.8%* | *0.7%* |

*(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.*

| *Assumed 24-Hour Traffic Distribution:* | *Day* | *Evening* | *Night* |
|---|---|---|---|
| *Total ADT Volumes* | *77.70%* | *12.70%* | *9.60%* |
| *Medium-Duty Trucks* | *87.43%* | *5.05%* | *7.52%* |
| *Heavy-Duty Trucks* | *89.10%* | *2.84%* | *8.06%* |

# APPENDIX 4.8

## Traffic Impact Analysis

# TRAFFIC IMPACT ANALYSIS REPORT

## Proposed Commercial Redevelopment of Parcel 44 on Admiralty Way between Bali Way and Mindanao Way in Marina del Rey, California

**Prepared for:**

**Pacific Ocean Management, LLC**
**13575 Mindanao Way**
**Marina del Rey, California 90292**

**Prepared by:**

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13333 Ventura Boulevard, #204
Sherman Oaks, California 91423


**OCTOBER 2013**

## EXECUTIVE SUMMARY

The project under consideration is the proposed redevelopment of the landside uses occupying Parcel 44, a u-shaped site located within the Marina del Rey area of Los Angeles County, along the west side of Admiralty Way between Bali Way and Mindanao Way and surrounding the eastern portion of Basin G of the Marina. The landside portion of Parcel 44 is currently developed with a number of small one and two-story structures housing a total of approximately 14,724 square feet of commercial, retail, and marine-related uses, including an approximately 7,844 square foot boat sales facility ("Boat Brokers"), a total of approximately 4,216 square feet of office space, an approximately 1,000 square foot boat repair operation ("Seamark"), an approximately 1,080 square foot yacht club, an approximately 111-space dry boat storage facility, and an approximately 584 square foot boater bathroom facility, as well as surface parking lots surrounding and serving each of these uses. However, the majority of the site is currently utilized as boat parking/storage for the boat sales and/or boat repair businesses. Additionally, the Marvin Braude Bike Path, which traverses the east side of Marina del Rey and connects the bicycle lanes on Washington Boulevard with the bike facilities along Fiji Way, runs north-south through the on-site parking and boat storage lots to the east of Basin G. A private anchorage containing total of approximately 205 existing boat berthing spaces (boat slips) is also located on the waterside portion of Parcel 44.

The proposed project will remove all of the existing development on Parcel 44, including the surface parking lots, to construct five new commercial buildings (plus three small buildings housing boater restroom facilities) containing a total of approximately 83,253 square feet of visitor-serving and/or marine-related retail (including a supermarket), restaurant/dining facilities, and general and governmental office space. Specifically, the new development is proposed to contain a total of approximately 13,795 square feet of general visitor-serving retail space, approximately 25,000 square feet of marine-related retail, an approximately 13,625 square foot specialty market, approximately 9,855 total square feet of restaurant space (providing approximately 382 total seats, including outdoor dining), a 700 square foot boat repair office (with associated open air service yard), a mast-up/dry stack boat storage facility housing up to approximately 69 boats, a total of approximately 16,588 total square feet of office space (including general office, Marine Administrative Offices, and boat sales offices), an approximately 1,150 square foot yacht club, an 840 square foot community room/boater lounge, and 1,700 square feet of boater support facilities including bathrooms and laundry rooms.

Additionally, while the project application does not include redevelopment of the waterside portion of the parcel, the existing private boat anchorage, which currently provides a total of approximately 205 boat slips will be redeveloped by the project applicant at or around the same time as the landside redevelopment of Parcel 44 pursuant to a previous land use approval granted by the California Coastal Commission (Coastal Development Permit No. 5-11-131). This prior approval allows for the redevelopment of the waterside portion of the parcel with a total of approximately 148 boat slips, which will replace and upgrade the existing boat slips. Therefore, in order to appropriately account for the effects of this previously-approved reduction in the number of boat slips located on the waterside portion of the Parcel 44 project site, this change has also been included as part of the overall traffic analyses for the proposed project.

The proposed project will also provide approximately 477 on-site vehicular parking spaces and 76 bicycle parking spaces to serve the site (including both the new landside development and the redeveloped waterside boat berthing spaces), located in a series of surface parking lots adjacent to or surrounding each of the new buildings.  The proposed total of 477 vehicular parking spaces is approximately seven (7) spaces fewer than the 484 vehicular parking spaces required for the project under the provisions of the current Los Angeles County Zoning Code. However, a detailed “shared parking” analysis prepared for the proposed project indicates that, once consideration is given to the hourly variability of the parking demands for the various uses proposed, the actual maximum parking demand is expected to be approximately 457 spaces on typical weekdays, and approximately 398 spaces on weekends.  Therefore, the project’s proposed vehicular parking supply is adequate to accommodate the anticipated peak demands of the site at all times, and no on-site project-related parking shortages are anticipated.

Vehicular access to the project’s parking facilities will be provided by driveways located along each of the project’s frontages, including three driveways on Mindanao Way, four driveways on Bali Way, and a single driveway on Admiralty Way.  Each of these roadways exhibit raised median islands adjacent to the project frontages.  Both Bali Way and Mindanao Way currently provide openings in the median islands to permit left-turns into and out of the Parcel 44 site, although some modification of the locations and/or sizes of these existing median openings will be necessary in order to align with the proposed new project driveways.  Admiralty Way also provides an opening in the raised median island adjacent to the project’s proposed driveway location.  However, this opening is currently configured with only a southbound left-turn pocket, to allow access into an existing medical/office complex driveway on the east side of the street approximately opposite the proposed project driveway; no northbound left-turn lane is provided at this location, since there is no driveway on the west side of Admiralty Way opposite the median opening. Therefore, in order to enhance access to the Parcel 44 site, the project proposes to construct a new northbound left-turn lane at this existing median opening to allow vehicles to enter the site from that direction of Admiralty Way. However, although both northbound left-turn and southbound right-turn entry is proposed for this site driveway, it is anticipated that this driveway be restricted to right-turn only exits, prohibiting access from this driveway to northbound Admiralty Way, in order to minimize potential site access conflicts and reduce the potential for vehicular queues along Admiralty Way. The project will also construct a deceleration lane on the Admiralty Way approach to the site driveway, to minimize disruptions to southbound through traffic flows from project-related traffic slowing to enter the new driveway.

In addition to the deceleration lane and other site access-related median island modifications (including new northbound left-turn lane on Admiralty Way at the new site driveway), the Department of Beaches and Harbors has indicated that the proposed project will be required to improve Mindanao Way to provide a second westbound travel lane along the full length of the project site's frontage, in order to accommodate the additional traffic anticipated to be generated by the proposed new development. This improvement will require the project to reduce the width of the existing Mindanao Way median islands along their northern sides by approximately two feet (from the existing six feet to four feet), and to stripe westbound Mindanao Way to provide two 10-foot westbound lanes along the project's entire frontage. The eastbound roadway of Mindanao Way will also be striped to provide two 10-foot travel lanes between the project's western boundary and Admiralty Way, although this improvement will not require any further median island modifications. Further, the proposed project will also be required to widen the south side of Mindanao Way west of its intersection with Admiralty Way in order to install a new eastbound shared through/right-turn lane (and restripe the intersection to convert the existing eastbound shared through/right-turn lane to a shared left-turn/through lane, in addition to the existing left-turn only lane). Although this measure is part of larger improvements to this intersection that would otherwise typically be installed by the County, due to the potential additional traffic demands at this intersection associated with the proposed project, the County has indicated it will require the project to install the improvement.

Further, the proposed project will be required to increase the curb return radii adjacent to the project site at the intersections of Admiralty Way and Mindanao Way, and at Admiralty Way and Bali Way from 25 feet to 35 feet, and to improve the existing sidewalks adjacent to the project site to provide an eight-foot wide sidewalk along the project's entire Admiralty Way frontage, while along both Mindanao Way and Bali Way, the proposed project will be required to provide eight-foot wide sidewalks between Admiralty Way and the existing Marvin Braude Bike Path, and five-foot wide sidewalks along the remainder of the project frontages of both streets.

Finally, in addition to the site frontage and access-related roadway/median island improvements described in the preceding paragraphs, the County's Department of Beaches and Harbors has indicated that the proposed project should be required to relocate the existing (non-project) access driveways to both Public Parking Lot No. 5 (on the north side of Bali Way west of Admiralty Way) and to the parking lot serving the Marina del Rey Visitor's Center (on the south side of Mindanao Way, also west of Admiralty Way) to align each of these existing driveways opposite the proposed project's new driveways. Further, in order to improve safety and minimize potential conflicts between vehicular traffic and bicyclists and pedestrians using the Marvin Braude Bike Path, the Department of Beaches and Harbors has requested that new speed humps or speed tables be installed in both directions on both Mindanao Way and Bali Way in advance of the bike path crossings of those roadways, along with appropriate signage.

This study evaluated the existing (year 2013) and forecast future (year 2016) conditions at a total of 25 intersections in the Marina and surrounding vicinity of the project during the typical weekday AM and PM peak commute traffic hours, as required by the Los Angeles County Department of Public Works Traffic and Lighting Division. Five of the study intersections are located within the exclusive jurisdiction of Los Angeles County and 14 of the intersections are under the jurisdiction of the City of Los Angeles, with the remaining six locations exhibiting shared jurisdiction between the County and City, although these shared intersections are generally operated and maintained by the City of Los Angeles.

Once completed and fully occupied (anticipated by the end of 2016), the proposed project could result in a net increase in site-related trips (following adjustments to account for the removal of traffic generated by the existing site development) of approximately 3,753 net daily trips, including approximately 79 net new trips (53 inbound, 26 outbound) during the AM peak hour, and approximately 387 net new trips (206 inbound, 181 outbound) during the PM peak hour.

Based on this level of net new traffic, the analyses summarized in this report indicate that the project itself could result in significant impacts at a total of four of the 25 study intersections under the "Existing (2013) With Project" analysis scenario, including one under the jurisdiction of the County alone (at the site-adjacent intersection of Admiralty Way and Mindanao Way). The remaining significant impacts occur at two intersections under the exclusive jurisdiction of the

City of Los Angeles (Lincoln Boulevard and Venice Boulevard, and Lincoln Boulevard and Washington Boulevard), and one two additional intersection under joint County/City jurisdiction (Lincoln Boulevard and Mindanao Way). No project-specific significant impacts are anticipated under the County's forecast future "Existing Plus Ambient Growth Plus Project" scenario (which is applicable only to the five study intersections under County-only jurisdiction, while the project could result in a total of seven significant impacts under the City of Los Angeles Department of Transportation's ("LADOT") "Future (2016) With Project" analysis scenario, which is considered to be applicable to the 20 study intersections under exclusive or shared jurisdiction of the City. These locations include the three City or shared-jurisdiction intersections impacted under the "Existing Plus Project" conditions (Lincoln Boulevard and Venice Boulevard, Lincoln Boulevard and Washington Boulevard, and Lincoln Boulevard and Mindanao Way), plus one additional shared-jurisdiction location (Lincoln Boulevard and Fiji Way), and three additional intersections under sole jurisdiction of the City (Lincoln Boulevard and Marina Expressway, Mindanao Way and Eastbound Marina Expressway, and Lincoln Boulevard and Jefferson Boulevard). However, it should be noted that the significant impacts at each of these seven locations occur only under the City of Los Angeles traffic impact analysis methodology.

Finally, the analyses summarized in this report indicate that cumulative increases in traffic within the study area, including typical "ambient" traffic growth as well as new trips generated by ongoing development in the Marina and surrounding vicinity (including trips from the proposed Parcel 44 project) could result in significant impacts to four of the five study intersections under County jurisdiction (the "cumulative" impact analyses are applicable only to those five locations), with only the intersection of Admiralty Way and Fiji Way not exhibiting a significant impact.

The Marina del Rey Specific Plan ("Specific Plan"), which incorporates the recently-adopted Marina del Rey Land Use Plan ("LUP") Amendment, identifies a number of transportation and circulation improvements that are designed to mitigate the traffic generation of ongoing development in Marina del Rey, of which the proposed Parcel 44 project is a part. These improvements include both local Marina and sub-regional cumulative roadway improvements that are designed to address both the incremental (project-specific) and cumulative traffic impacts from projects developed within Marina del Rey, as well as from traffic demands created by other developments outside the County's jurisdiction that utilize the Marina roadway system.

These roadway improvements are funded (in part) by a traffic impact mitigation fee imposed by the County, which all new development projects within the Marina, including the proposed Parcel 44 redevelopment project, are required to pay. These fees provide "fair share" contributions from each Marina development project toward the identified improvements based on the number of net new PM peak hour trips generated by each project; the County's current traffic impact mitigation fee is $5,690 per net new PM peak hour trip. Therefore, based on the applicable net project trip generation level of approximately 411 net new PM peak hour trips, the proposed Parcel 44 redevelopment project will be required to pay a total of approximately $2,338,590 in traffic impact mitigation fees (per the County Department of Public Works policies, the number of project-related trips applicable to the traffic impact mitigation fee does not include otherwise applicable reductions of approximately 24 PM peak hour pass-by trips, which were appropriately used to analyze the proposed project's potential traffic impacts, increasing the number of net project trips from the 387 PM peak hour trips identified earlier). As noted above, these fees will be applied toward the project's "fair share" costs of implementing the roadway and intersection improvements described in the Marina del Rey Specific Plan LUP.

The County's Department of Public Works has expressed that it prefers to coordinate and implement the local and regional roadway improvements identified in the Specific Plan LUP itself, in order to reduce overall construction time and minimize traffic disruptions associated with these improvements. Therefore, payment of the traffic impact mitigation fee noted above is the recommended method of addressing the proposed project's traffic impact mitigation, rather than the incremental or partial construction of any of the relevant Specific Plan roadway improvements by the project applicant. However, should the County determine that the immediate implementation of roadway improvements is necessary to address the potential project-specific traffic impacts of proposed Parcel 44 development project, the following measures are recommended for each of the eight intersections potentially significantly-impacted by the proposed project (one under the joint County/City "Existing Plus Project" scenario, and seven additional locations under the City's "Future Plus Project" scenario).

*Project-Specific Mitigation Measures*

Los Angeles County Intersections

- Admiralty Way and Mindanao Way – Although the project could result in a significant impact at this intersection during the PM peak hour under the "Existing With Project" analysis scenario, that evaluation assumed that this location would be improved with the project-required improvements to the eastbound approach of Mindanao Way for the analysis of potential project-related impacts for that scenario. However, the County is currently nearing completion on the construction of improvements to Admiralty Way that will install new southbound dual left-turn lanes at this intersection. Once the ongoing installation of the dual southbound left-turn lanes is completed, the project's impacts will become less-than-significant during both peak hours. Therefore, no improvements to this intersection (beyond the project-required improvement to eastbound Mindanao Way and the ongoing improvements being installed by the County) are necessary.

Shared Los Angeles County/Los Angeles City Intersections

- o Lincoln Boulevard and Mindanao Way – This intersection is under the shared jurisdiction of the County and City of Los Angeles. The "Revised Set of Intersection Improvements" contained in the updated LUP does not identify any roadway improvements for this location, although the (now-superseded) Transportation Improvement Program ("TIP") of the prior LUP included an improvement to install a new northbound right-turn only lane on Lincoln Boulevard at Mindanao Way. However, this measure has already been installed, and a review of this location indicates that there are no additional rights-of-way available to widen any of the intersection approaches, and as such, no further feasible improvements are available to address the project's potential impacts at this location.

- o Lincoln Boulevard and Fiji Way – This intersection is also under the shared jurisdiction of the County and City of Los Angeles, and as a result, the updated LUP does not identify any roadway improvements for this location, although the previous TIP included a measure to install a second eastbound left-turn lane on Fiji Way at Lincoln Boulevard (this recommendation has since been abandoned). This location is currently improved to the extent possible on each of its approaches, and no rights-of-way are available to increase capacity through the installation of additional lanes. As a result, no further improvements are feasible to mitigate the project's potential impacts at this intersection.

City of Los Angeles Intersections

The Marina del Rey Specific Plan does not include intersections that are not under the full or partial jurisdiction of the County, and as a result, the LUP does not identify any programmed improvements at any of the five intersections listed below, each of which is located wholly within and operated under the jurisdiction of the City of Los Angeles. Additionally, as noted earlier in this report, all of the intersections in the study area, including the locations listed below, have been improved with the City's ATSAC/ATCS traffic signal coordination system, and as such, no further signal-related operational improvements are currently available. Further, detailed field surveys conducted at each of these intersections indicate that most already exhibit capacity enhancements beyond the typical intersection improvements (including additional left-turn lanes or exclusive right-turn only lanes). Finally, research of these locations indicated that there are currently no additional rights-of-way available to widen any of the approaches at any of these intersections, and as such, no further improvements to address the potential project impacts at these locations are feasible.

- Lincoln Boulevard and Venice Boulevard
- Lincoln Boulevard and Washington Boulevard
- Lincoln Boulevard and Marina Expressway
- Mindanao Way and Eastbound Marina Expressway
- Lincoln Boulevard and Jefferson Boulevard

Therefore, based on these observations and evaluations, of the eight potential project-specific significant impacts identified in this analysis, only the impact at the site-adjacent intersection of Admiralty Way and Mindanao Way (which occurs only under the “Existing Plus Project” analysis scenario) exhibits any feasible mitigation; the County’s installation of dual left-turn lanes on the southbound approach of Admiralty Way, which is currently under construction and scheduled for completion in the first quarter of 2014, will reduce the proposed project’s potential impact at this location to less-than-significant levels, and as discussed earlier, the project’s impact at this intersection are not significant under the any of the future (year 2016) analysis scenarios. However, no feasible roadway or traffic signal improvements are available at any of the remaining seven City-only or shared County/City jurisdiction locations, and as such, the potential project-specific impacts at these intersections will remain significant and unavoidable.

*Cumulative Mitigation Measures*

In addition to the project-specific traffic impacts described in the preceding pages, potential cumulative traffic impacts (resulting from total development throughout the project vicinity, including the proposed project) could occur at four of the five study intersections under the jurisdiction of the County of Los Angeles; Admiralty Way and Via Marina, Admiralty Way and Palawan Way, Admiralty Way and Bali Way, and Admiralty Way and Mindanao Way, each during the PM peak hour only. As described earlier, the programmed roadway improvements identified in the Marina del Rey Specific Plan’s LUP are designed to address the effects on continued traffic growth due to cumulative development within and surrounding the Marina, and as such, payment of the proposed Parcel 44 project's $2,338,590 traffic impact mitigation fee is intended to mitigate the proposed project's incremental contributions to the anticipated future cumulative traffic growth and its associated impacts.

Therefore, the roadway improvements listed in the LUP (and funded in part by the project's traffic impact mitigation fees) were further reviewed in order to identify which measures may be effective in addressing the potential cumulative traffic impacts in the study area. The applicable LUP roadway improvements are described below.

- Admiralty Way and Via Marina – Two potential roadway improvement alternatives are identified in the Specific Plan to address cumulative traffic impacts at this intersection:

    1) The first roadway improvement alternative ("LUP A") includes the installation of a third left-turn lane (in addition to the two existing right-turn only lanes) on the westbound approach of Admiralty Way at Via Marina, and would also convert one of the three existing southbound through lanes to a new left-turn lane (resulting in a final southbound configuration of two left-turn lanes and two through lanes). The northbound approach of this intersection would remain unchanged, and continue to provide two through lanes and one right-turn only lane. The Specific Plan does not identify whether roadway widenings are necessary to implement this improvement.

    2) The second alternative ("LUP B") would reconstruct this intersection to realign Admiralty Way and the south leg of Via Marina to operate as a "through roadway", with the north leg of Via Marina intersecting the realigned Admiralty Way/Via Marina roadway in a "T" configuration. The resulting intersection would include two through lanes in each direction along realigned Admiralty Way/Via Marina, with one westbound right-turn lane and dual eastbound left-turn lanes from this roadway onto the north leg of Via Marina, while the southbound approach of Via Marina at the intersection would provide two left-turn lanes and a single right-turn lane.

- Admiralty Way and Palawan Way – There are also two potential roadway improvements identified in the Specific Plan's LUP to address the cumulative impact at this intersection:

    1) In addition to improvements currently being installed at this intersection by the County to restripe northbound Palawan Way to convert the existing left-turn lane to a shared left-turn/through lane (with the existing shared through/right-turn lane

remaining unchanged), and to add a new exclusive westbound right-turn only lane on Admiralty Way, the first improvement alternative ("LUP A") would restripe the southbound approach of Palawan Way to convert the existing through lane to a shared left-turn/through lane (but leave the existing left-turn and right-turn lanes unchanged), and would further improve the westbound approach of Admiralty Way to provide an additional (third) through lane (west of Palaway Way). This alternative improvement would also convert the new westbound right-turn only lane into a shared through/right-turn lane, to provide a future configuration of one left-turn lane, two through lanes, and one shared through/right-turn lane. The eastbound approach would continue to exhibit its current configuration of one left-turn lane, one through lane, and one shared through/right-turn lane. As with the ongoing improvement at this location, due to the proposed "shared through/left-turn lane" configuration for southbound Palawan Way, this alternative will require modification of the existing traffic signal to provide north/south opposed phasing operation.

2) The second Specific Plan roadway improvement alternative ("LUP B") is similar to the LUP A alternative described above, and would again modify westbound Admiralty Way to provide a third westbound lane west of the intersection, and convert the new westbound right-turn only lane to a shared through/right-turn lane (again with no changes to the eastbound approach lane configuration). However, this alternative would also restripe northbound Palawan Way to convert the existing shared through/right-turn lane to an exclusive right-turn only lane, while keeping the new shared left-turn/through lane currently being constructed. Additionally, this alternative would modify the southbound approach of Palawan Way to add a second left-turn lane (resulting in a final southbound lane configuration of two left-turn lanes, one through lane, and one right-turn only lane). As with the LUP A alternative, the traffic signal would be modified to operate with opposed north/south phasing.

- <u>Admiralty Way and Bali Way</u> – The LUP improvement to add a second left-turn lane on southbound Admiralty Way at Bali Way, resulting in a final lane configuration for this approach of two left-turn lanes, one through lane, and one shared through/right-turn lane is currently under construction, and no further improvements are proposed.

- <u>Admiralty Way and Mindanao Way</u> – In addition to improvements to this intersection currently being installed by the County to provide a second southbound left-turn lane on Admiralty Way at Mindanao Way, and the project-required improvement to widen the south side of Mindanao Way to install a new shared through/right-turn lane on the eastbound approach of this street (and convert the current shared through/right-turn lane to a shared left-turn/through lane) described earlier (which is also part of the overall LUP improvement at this location), the remaining LUP improvements at this intersection would restripe the westbound approach of Mindanao Way to convert the existing shared left-turn/through lane to a shared left-turn/through/right-turn lane. The traffic signal phasing at this location will continue to exhibit the current east-west “split” phase operations, due to the proposed new eastbound/westbound lane configurations.

The results of a supplemental analysis of the effectiveness of these potential improvements indicates that implementation of LUP alternative improvement “A” at the intersection of Admiralty Way and Via Marina will reduce the potential PM peak hour significant traffic impact resulting from anticipated cumulative increases in traffic (including from the proposed project) at this intersection to a less-than-significant level; however, while LUP alternative improvement “B” would also reduce the cumulative PM peak hour impact at this location to less-than-significant levels, this measure would actually result in the creation of a new secondary significant impact during the AM peak hour. Similarly, the installation of LUP alternative improvement “B” at Admiralty Way and Palawan Way would reduce the PM peak hour cumulative impact at that location to less-than-significant levels, while LUP alternative improvement “A” would reduce but not fully mitigate the impact. As such, it is recommended that LUP alternative improvement “A” be installed at the intersection of Admiralty Way and Via Marina to mitigate the potential cumulative traffic impacts at that intersection, while LUP alternative improvement “B” should be implemented at the intersection of Admiralty Way and Palawan Way in order to address the potential impacts of forecast future traffic growth in the project vicinity.

However, these supplemental analyses also indicate that the intersection improvements identified in the current Marina del Rey LUP update are not expected to be sufficient to mitigate the anticipated cumulative impacts at the two site-adjacent intersections of Admiralty Way and Bali Way, and Admiralty Way and Mindanao Way. Further, an examination of these locations indicated that there are no additional feasible roadway improvement or mitigation alternatives available beyond the measures identified in the updated LUP, and as a result, the potential cumulative traffic impacts at both intersections will remain significant and unavoidable (although it is important to note that, as described earlier in this section, the project-specific impacts of the proposed Parcel 44 project at Admiralty Way and Mindanao Way will be fully mitigated, and no project-specific impacts are identified at the intersection of Admiralty Way and Bali Way).

Nonetheless, the supplemental cumulative impact mitigation analyses also show that, while not fully mitigating all potential traffic impacts associated with anticipated cumulative development in and around the Marina, the implementation of the LUP mitigation measures (including those alternatives that do not fully mitigate the potential cumulative impacts) are expected to improve or maintain the operations of the four subject intersection at acceptable (LOS D or better) conditions during both the AM and PM peak hours at each of these locations, even with the increases in vehicular demands at this location due to the addition of traffic associated with cumulative development in the area. The remaining intersection of Admiralty Way and Fiji Way, which is not anticipated to experience any significant cumulative traffic impacts, is forecast to exhibit acceptable operational conditions under the anticipated cumulative traffic conditions during both peak hours without any additional roadway improvements. As such, while potential significant cumulative traffic impacts may remain at the two site-adjacent intersections of Admiralty Way and Mindanao Way, and Admiralty Way and Bali Way following implementation of the LUP intersection and/or roadway improvements identified for these location, these measures will result in benefits to the traffic flows in the project vicinity and throughout the Marina, and reduce the potential for future vehicular queuing and congestion in the study area.

As described earlier, the County Department of Public Works has historically expressed that it prefers to implement the roadway improvements identified in the Marina del Rey LUP, of which both the project-specific and cumulative mitigation measures recommended are a part, as a single major roadway improvement project in order to minimize traffic disruptions and reduce construction time. As such, payment of the identified traffic impact mitigation fee is the recommended approach to address both the project-specific as well as cumulative impacts of the proposed Parcel 44 project, rather than the actual construction of any of the improvements by the project itself. However, it should also be noted that no feasible alternative improvements to either the project-specific or cumulative mitigation measures, beyond those already described, have been identified at any of the significantly impacted intersections. Therefore, should the recommended mitigation improvement(s) not be accepted by the County, the potential traffic impacts identified in this analysis would remain significant and unavoidable.

As briefly noted earlier, the proposed project will include approximately 477 on-site vehicular parking spaces (including a total of approximately 34 tandem spaces) and 76 bicycle parking spaces to serve its various uses. While the number of bicycle spaces is adequate to meet the County's current Zoning Code, the number of vehicular parking spaces proposed will be about seven (7) spaces deficient of the total of 484 vehicular parking spaces required for the new development (including both the landside and waterside portions of the redevelopment project). However, a shared parking analysis prepared for the proposed project, accounting for the variability in parking needs for the various project components throughout the day, indicates that the actual maximum parking demands anticipated for the new development will be somewhat lower than that identified using the "static" Zoning Code parking ratios, with a peak demand of approximately 457 vehicular parking spaces, or about 20 spaces fewer than are proposed to be provided. As such, the project's proposed 477-space parking supply will be sufficient to accommodate the anticipated peak parking demand periods, which occur generally during an approximately two-hour period in the middle part of a typical weekday (the project's peak weekend vehicular parking demands are expected to be considerably lower, at a maximum of approximately 398 spaces), and as such, no on-site parking shortages or "overflow" parking onto adjacent streets or public parking areas are anticipated.

It is important to note that the shared parking analyses also indicated that, during the peak weekday parking demand activity (from approximately 12:00 noon to 12:00 PM), the total parking demands for the project are expected to exceed the 443 "self-park" spaces provided (not counting the 34 tandem spaces), and therefore will necessitate use of approximately 20 of the tandem spaces to accommodate the anticipated parking demands during this period. However, throughout the remainder of the typical weekday activity, the total project parking demands are expected to be less than 443 spaces, and as such, use of tandem spaces will not be needed, and all project-related parking can be accommodated within the "self-park" spaces. Therefore, it is recommended that any valet or parking attendant assisted parking for the project be required only during the peak weekday parking activity periods from approximately 11:00 AM to about 3:00 PM. No use of the tandem spaces will be necessary on weekends, and as such, no valet or attendant assisted parking requirement is warranted.

*Other Project-Impact Mitigation Measures*

A review of the proposed configuration and anticipated operation of the project's on-site parking and internal vehicular circulation scheme indicates that it will be acceptable, and will provide sufficient driveway entry and exit capacity at all site access locations to accommodate the anticipated site-related traffic demands. Further, both on-street and internal (on-site) vehicular queuing and/or congestion is expected to be minimal, and no significant impacts with respect to site access or internal vehicular circulation are anticipated. Additionally, the installation of the improvements to the site-adjacent bicycle path expected to be required by the County is expected to address any potential existing or future (project-related) impacts to bicycle and pedestrian activity in the project vicinity.  As such, no project site access-related or on-site vehicular, pedestrian, or bicycle mitigation measures, other than the driveway and/or median island modifications described earlier in this study, are warranted.

Finally, the proposed Parcel 44 redevelopment project is not anticipated to produce sufficient net new traffic to create significant impacts to any of the surrounding CMP arterial monitoring intersections or freeway segments, nor are any significant impacts to the public transit facilities serving the study area anticipated.  Therefore, no project mitigation measures associated with either of these issues are necessary.

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## INTRODUCTION

The project evaluated in this study is the proposed redevelopment of the landside portion of Parcel 44, located within the Marina del Rey area of Los Angeles County, along the west side of Admiralty Way between Bali Way and Mindanao Way and surrounding the eastern portion of Basin G of the Marina. The location of the project site is shown in Figure 1.

The landside portion of the Parcel 44 project site is currently developed with a number of small one and two-story structures housing a total of approximately 14,724 square feet of commercial, retail, and marine-related uses, including boat sales, boat service and repair, commercial office space, yacht clubs, and boater bathroom facilities, as well as an approximately 111-space dry boat storage facility; the waterside portion of Parcel 44 also includes a private anchorage containing a total of approximately 205 existing boat berthing spaces (boat slips). A number of surface parking lots surround and serve these uses, although the majority of the site is currently utilized as boat parking/storage for the boat sales and/or boat repair businesses. Additionally, the Marvin Braude Bike Path, which traverses the eastern half of Marina del Rey and connects the bicycle lanes on Washington Boulevard with the bike facilities along Fiji Way, runs roughly north-south across the entire project site generally along the eastern edge of Basin G.

The proposed project will remove all of the existing development on Parcel 44, including the surface parking lots, to construct five new commercial buildings (plus three small buildings housing boater restroom facilities) containing a total of approximately 83,253 square feet of visitor-serving and/or marine-related retail (including a supermarket), restaurant/dining facilities, and general and governmental office space. Specifically, the new development is proposed to consist of a total of approximately 13,795 square feet of general visitor-serving retail space, approximately 25,000 square feet of marine-related retail uses (West Marine), an approximately 13,625 square foot specialty market (Trader Joes or similar), approximately 9,855 square feet of restaurant space (providing a total of approximately 382 seats, including outdoor dining areas), a 700 square foot boat repair office (with associated open air service yard), an unenclosed, mast-up and dry stack boat storage facility accommodating approximately 69 boats, a total of approximately 16,588 square feet of office space (including 9,170 square feet of general office, 2,285 square feet of Marine Administrative Offices, and 5,133 square feet of boat sales offices), a 1,150 square foot yacht club, an 840 square foot community room/boater lounge (including a small kitchen area), and a total of 1,700 square feet of boater-related support facilities including boater-only bathrooms and laundry rooms.

PARCEL 44 \ VICINITY


FIGURE 1

1/7/2012

HIRSCH
GREEN
Hirsch/Green Transportation Consulting, Inc.

PROJECT SITE VICINITY

Additionally, while the project application does not include redevelopment of the waterside portion of the parcel, the existing private boat anchorage, which currently provides a total of approximately 205 boat slips will be redeveloped by the project applicant at or around the same time as the landside redevelopment of Parcel 44 pursuant to a previous land use approval granted by the California Coastal Commission (Coastal Development Permit No. 5-11-131). This prior approval allows for the redevelopment of the waterside portion of the parcel with a total of approximately 148 boat slips, which will replace and upgrade the existing boat slips. Therefore, in order to appropriately account for the effects of this previously-approved reduction in the number of boat slips located on the waterside portion of the Parcel 44 project site, this change has also been included as part of the overall traffic analyses for the proposed project.

The proposed project will also provide a total of approximately 477 on-site parking spaces, located in a series of surface parking lots adjacent to or surrounding each of the new buildings. Vehicular access to these parking facilities will be provided by driveways located along each of the project's three frontages, including three driveways along Mindanao Way, four driveways along Bali Way, and a single driveway along Admiralty Way.

The project applicant retained Hirsch/Green Transportation Consulting, Inc. ("Hirsch/Green") to study the potential traffic and parking impacts of the proposed redevelopment project. Based on consultation and agreements with the Traffic and Lighting Division of the Los Angeles County Department of Public Works, this report contains a detailed analysis of the existing and forecast future weekday AM and PM peak hour traffic conditions, including the identification of potential project-related impacts, at a total of 25 intersections adjacent to or in the vicinity of the project, as listed below and shown in relation to the project site in Figure 2.

1. Venice Boulevard and Lincoln Boulevard
2. Washington Boulevard and Pacific Avenue
3. Washington Boulevard and Via Dolce/Dell Avenue
4. Washington Boulevard and Via Marina/Ocean Avenue
5. Washington Boulevard and Palawan Way
6. Washington Boulevard and Abbot Kinney Boulevard
7. Washington Boulevard and Lincoln Boulevard
8. Washington Boulevard and Glencoe Avenue/Costco Plaza Driveway
9. Admiralty Way and Via Marina

PARCEL 44 \ STUDY-INTS

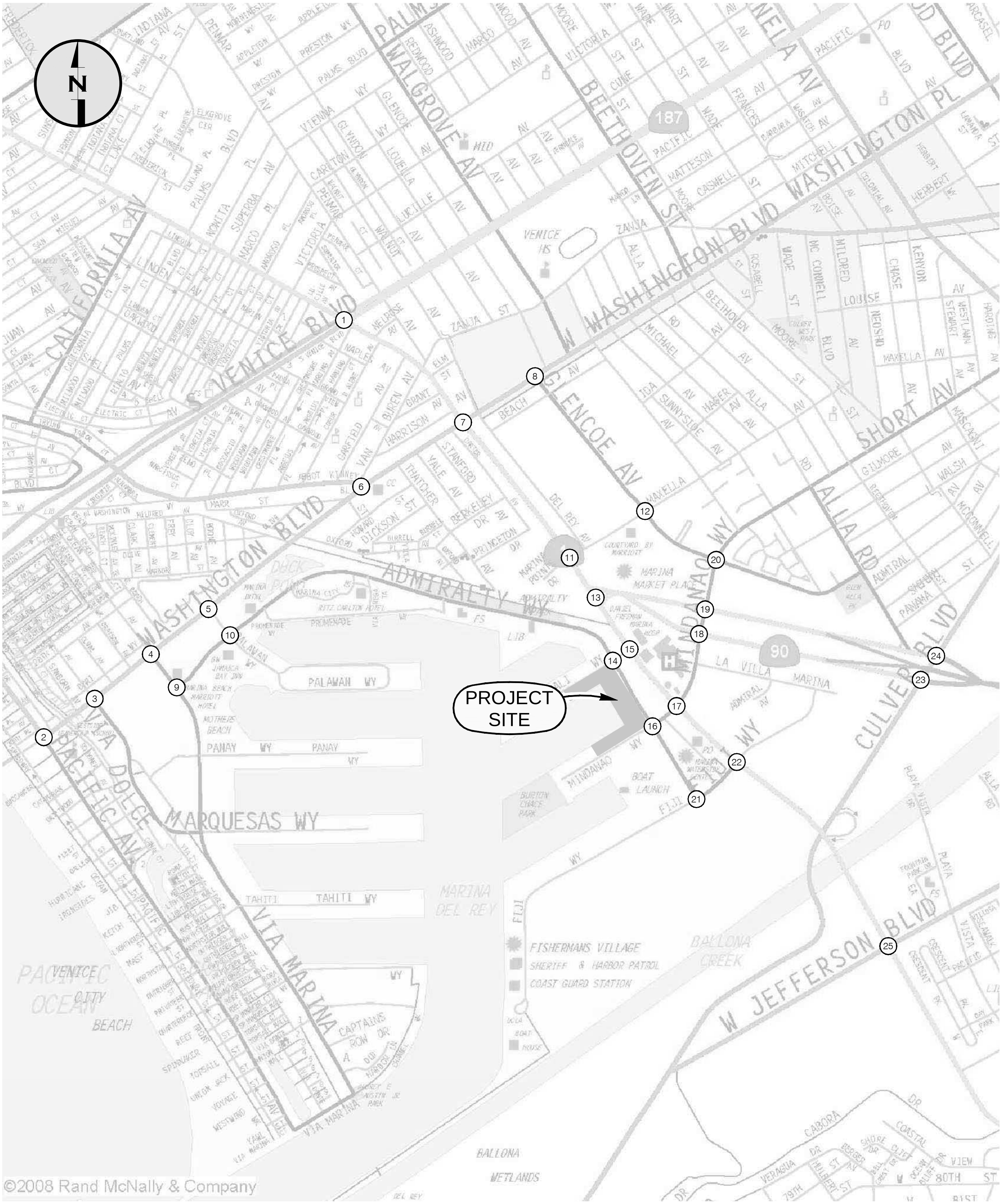


FIGURE 2

12/2/2011

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PARCEL 44 PROJECT
STUDY INTERSECTION LOCATIONS

10. Admiralty Way and Palawan Way
11. Lincoln Boulevard and Maxella Avenue/Marina Pointe Drive
12. Maxella Avenue and Glencoe Avenue
13. Lincoln Boulevard and Marina Expressway (SR-90)
14. Admiralty Way and Bali Way
15. Lincoln Boulevard and Bali Way
16. Admiralty Way and Mindanao Way
17. Lincoln Boulevard and Mindanao Way
18. Mindanao Way and Eastbound Marina Expressway (SR-90)
19. Mindanao Way and Westbound Marina Expressway (SR-90)
20. Mindanao Way and Glencoe Avenue
21. Admiralty Way and Fiji Way
22. Lincoln Boulevard and Fiji Way
23. Culver Boulevard and Eastbound Marina Expressway (SR-90) On/Off-Ramps
24. Culver Boulevard and Westbound Marina Expressway (SR-90) Off-Ramp
25. Lincoln Boulevard and Jefferson Boulevard

As shown in Figure 2, these 25 study intersections include five locations under the exclusive jurisdiction of the County of Los Angeles (intersections 9, 10, 14, 16, and 21), 14 intersections under the sole jurisdiction of the City of Los Angeles (intersections 1, 2, 6 through 8, 11 through 13, 18 through 20, and 23 through 25), and six additional intersections (3 through 5, 15, 17, and 22) exhibiting shared County/City jurisdiction (typically 25 percent County, 75 percent City). Based on the configuration of the roadway network in the study area, these locations are anticipated to be those most likely to be affected by traffic generated by the proposed project. Each of these intersections is currently traffic signal controlled, with the exception of Washington Boulevard and Palawan Way (intersection 5) which is a three-approach, STOP-sign controlled “tee” intersection (with Palawan Way terminating at Washington Boulevard).

## PROJECT DESCRIPTION

The project under consideration is the proposed redevelopment of the landside uses occupying Parcel 44, a u-shaped site located within the Marina del Rey area of Los Angeles County, along the west side of Admiralty Way between Bali Way and Mindanao Way and surrounding the eastern portion of Basin G of the Marina. The landside portion of Parcel 44 is currently developed with a number of small one and two-story structures housing a total of approximately 14,724 square feet of commercial, retail, and marine-related uses, including an approximately 7,844 square foot boat sales facility ("Boat Brokers"), a total of approximately 4,216 square feet of office space, an approximately 1,000 square foot boat repair operation ("Seamark"), an approximately 1,080 square foot yacht club, an approximately 111-space dry boat storage facility, and an approximately 584 square foot boater bathroom facility, as well as surface parking lots surrounding and serving each of these uses. However, the majority of the site is currently utilized as boat parking/storage for the boat sales and/or boat repair businesses. Additionally, the Marvin Braude Bike Path, which traverses the east side of Marina del Rey and connects the bicycle lanes on Washington Boulevard with the bike facilities along Fiji Way, runs north-south through the on-site parking and boat storage lots to the east of Basin G. A private anchorage containing total of approximately 205 existing boat berthing spaces (boat slips) is also located on the waterside portion of Parcel 44.

The proposed project will remove all of the existing landside development on Parcel 44 to construct five new commercial buildings (plus three small boater restroom buildings) containing a total of approximately 83,253 square feet of visitor-serving/marine-related retail (including a supermarket), restaurants, and general and governmental office space. Specifically, the new development will consist of a total of approximately 13,795 square feet of general visitor-serving retail space, approximately 25,000 square feet of marine-related retail uses (West Marine), an approximately 13,625 square foot specialty market (Trader Joes or similar), a total of approximately 9,855 square feet of restaurant space (approximately 382 total seats, including outdoor dining areas), a 700 square foot boat repair office and related facilities, an unenclosed, mast-up and dry stack boat storage facility accommodating a total of approximately 69 boats, approximately 16,588 square feet of office space (including 9,170 square feet of general office, 2,285 square feet of Marine Administrative Offices, and 5,133 square feet of boat sales offices), a 1,150 square foot yacht club, an 840 square foot community room/boater lounge (including a small kitchen area), and a total of 1,700 square feet of boater-related support facilities including boater-only bathrooms and laundry rooms.

PARCEL 44 \ IMP-CONCEPTUAL-1

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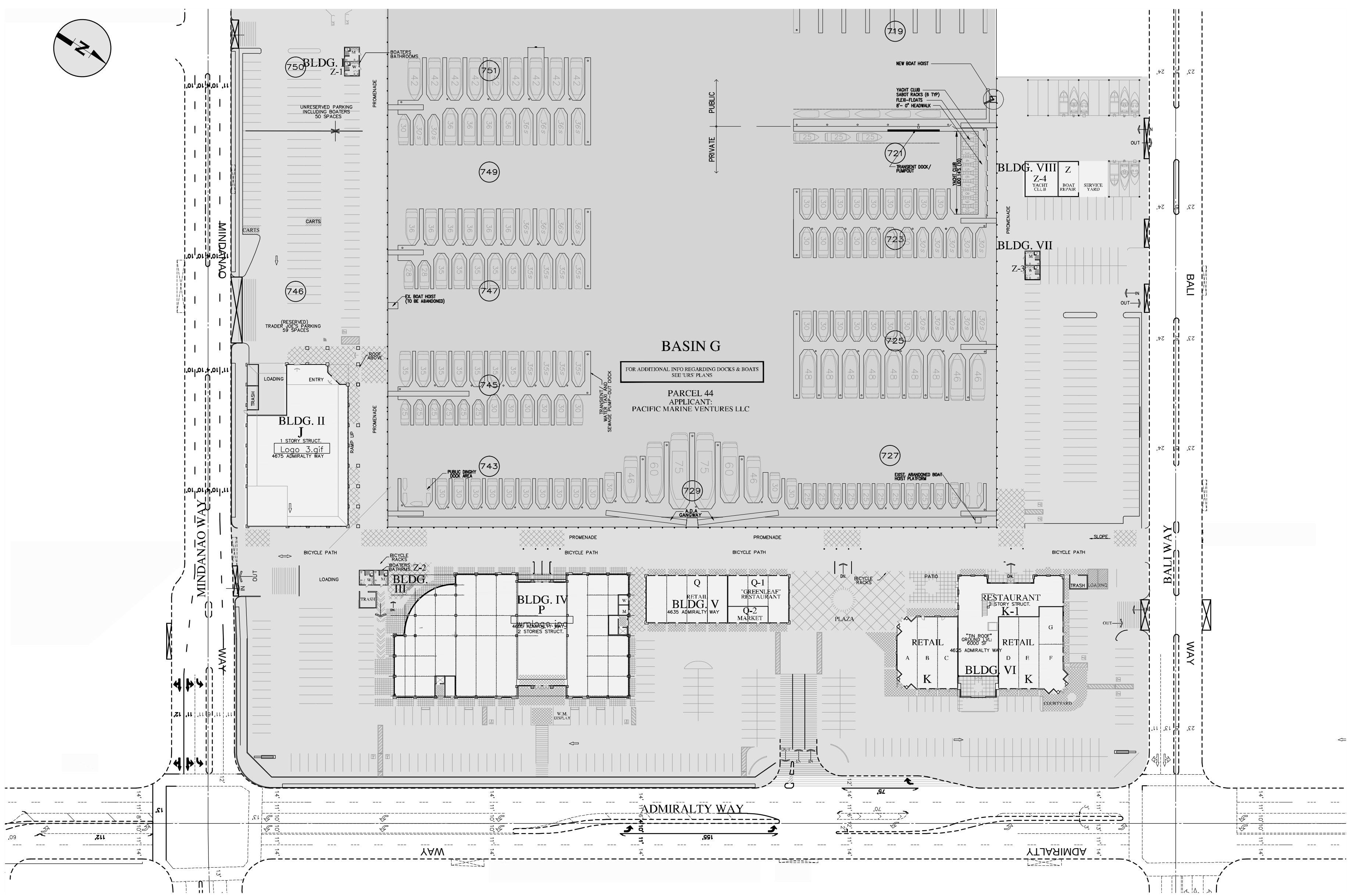


FIGURE 3

PARCEL 44
SITE LAYOUT

Additionally, while not part of the current landside redevelopment application, the project applicant will also redevelop the existing private anchorage located along the waterside portion of Parcel 44, under a separate land use approval (Coastal Development Permit No. 5-11-131) previously granted by the California Coastal Commission. This prior approval allows for the development of a total of approximately 148 boat berthing spaces (boat slips), which will replace and upgrade the existing 205 boat slips. Therefore, for purposes of this traffic study, in order to appropriately account for this change, the previously-approved boat slip reduction has been included as part of the analysis of the Parcel 44 landside redevelopment project.

**Project Traffic Generation**

Typically, estimates of the amount of traffic generated by projects located within the jurisdiction of the County of Los Angeles are based on information and data developed from surveys and studies conducted under the auspices of the Institute of Transportation Engineers ("ITE"), with the most widely-accepted information provided in the ITE's 8th Edition *Trip Generation* manual.[1] However, the project site lies within the Marina del Rey area of the County, and development within the Marina, including the methodology for estimating the trip generation of various land uses, is governed by the Marina del Rey Land Use Plan ("LUP"). Figure 10, provided in Chapter 11 ("Circulation") of the approved (November 2011) update of the LUP, identifies the weekday PM peak hour traffic-generating characteristics ("trip generation rates") for a number of the existing and anticipated future land uses within Marina del Rey, including the retail, office, restaurant, and boat slip uses comprising portions of the existing and/or proposed Parcel 44 site redevelopment project. These "Marina specific" trip generation rates are recognized as accurately representing the trip generation activity for developments within the Marina by the County's Department of Public Works Traffic and Lighting Division, and are therefore appropriate for use in estimating the traffic resulting from the proposed project.

However, the LUP data do not identify PM peak hour trip generation rates for several of the current or proposed uses on the Parcel 44 site, including the proposed "specialty market" and "community room" uses, or the "boat repair" and "yacht club" facilities that are part of both existing and proposed developments, nor are daily (24-hour) or AM peak hour trip generation rates identified in the LUP for any land use. Therefore, for purposes of this analysis, the trip generation rates for these time periods (daily and AM peak hour) for both the existing and/or proposed retail uses (both visitor-serving and marine-related) and office uses, were obtained

[1] *Trip Generation*, 8th Edition, Institute of Transportation Engineers, Washington, D.C., 2008.

from the ITE *Trip Generation* publication, as were the daily, AM, and PM peak hour trip generation rates for the proposed specialty market and community room components, and for the existing and proposed boat repair and yacht club uses. Note that both the "yacht club" use and "community room" space were assumed to operate in a manner similar to a "recreational community center", and based on consultation with the Traffic and Lighting Division staff, the ITE trip generation rate for that land use was deemed appropriate. Similarly, the trip generation characteristics associated with the "boat repair" facilities were assumed to be reasonably represented by the ITE's "automobile care center" land use. Based on these assumptions, the baseline trip generation rates utilized in this analysis are summarized in Table 1.

The LUP trip generation rates shown in Table 1 were developed specifically for use with projects located within the Marina, and similar to the ITE trip generation data, were generally derived based on empirical counts of vehicles entering and exiting the driveways of the subject land uses. However, as such, both the LUP and ITE trip generation rates reflect only the amount of traffic directly accessing the use itself, and so do not account for factors such as "pass-by" traffic that can influence the amount of "net" traffic generation associated with the various land uses. Pass-by traffic refers to the "capture" by a particular project or land use of a vehicle that is already on the area roadway network for other purposes, such as a trip to or from work, by providing convenient amenities or services that result in the driver diverting from the existing trip to patronize the site. Since such activity is only an interim stop along a trip which existed prior to the development of the project, vehicles making these stops are not considered to be newly generated project-related traffic.

Therefore, in order to more accurately identify the amount of "net new" traffic generated by the proposed project's uses, the trip generation for the proposed project was adjusted to account for potential pass-by traffic activity that could be associated with the new development. A review of both the existing and proposed land uses for the Parcel 44 site indicated that pass-by trip activity is not expected to be a significant factor for most of these uses, with only the proposed visitor-serving and/or marine-related retail uses expected to exhibit any appreciable pass-by traffic activity. Based on the locations of these new facilities, which front on Admiralty Way, and by agreement with the County's Department of Public Works Traffic and Lighting Division, it was estimated that approximately 1.0 percent of the existing traffic passing the project site along Admiralty Way (in the southbound direction only) would patronize these proposed retail uses as an interim stop along an otherwise existing trip, and therefore would be considered to be existing (pass-by trips) rather than new project-generated traffic added to the area roadways.

**Table 1**
**Existing and Proposed Uses Trip Generation Rates**

Visitor-Serving Retail - per 1,000 square feet of floor area (ITE Land Use 814))

| | |
|---|---|
| Daily Trips: | T = 42.94 (A) |
| AM Peak Hour: | T = 1.00 (A); I/B = 61%, O/B = 39% |
| PM Peak Hour:* | T = 4.44 (A); I/B = 49%, O/B = 51% |

Supermarket - per 1,000 square feet of floor area (ITE Land Use 850)

| | |
|---|---|
| Daily Trips: | T = 102.24 (A) |
| AM Peak Hour: | T = 3.59 (A); I/B = 61%, O/B = 39% |
| PM Peak Hour: | T = 10.50 (A); I/B = 51%, O/B = 49% |

Restaurant - per seat (ITE Land Use 932)

| | |
|---|---|
| Daily Trips:* | T = 2.86 (S) |
| AM Peak Hour:* | T = 0.03 (S); I/B = 50%, O/B = 50% |
| PM Peak Hour:* | T = 0.25 (S); I/B = 67%, O/B = 33% |

Office - per 1,000 square feet of floor area (ITE Land Use 710)

| | |
|---|---|
| Daily Trips: | T = 11.01 (A) |
| AM Peak Hour: | T = 1.55 (A); I/B = 88%, O/B = 12% |
| PM Peak Hour:* | T = 2.21 (A); I/B = 17%, O/B = 83% |

Yacht Club - per 1,000 square feet of floor area (assumed as Recreational Community Center, ITE Land Use 495)

| | |
|---|---|
| Daily Trips: | T = 22.88 (A) |
| AM Peak Hour: | T = 1.62 (A); I/B = 61%, O/B = 39% |
| PM Peak Hour: | T = 1.45 (A); I/B = 37%, O/B = 63% |

Boat Slips - per slip

| | |
|---|---|
| Daily Trips: | T = 2.883 (Sl) |
| AM Peak Hour: | T = 0.126 (Sl); I/B = 34%, O/B = 66% |
| PM Peak Hour:* | T = 0.137 (Sl); I/B = 36%, O/B = 64% |

Boat Dry Storage - per boat space

| | |
|---|---|
| Daily Trips:* | T = 0.334 (Sp) |
| AM Peak Hour:* | T = 0.048 (Sp); I/B = 65%, O/B = 35% |
| PM Peak Hour:* | T = 0.048 (Sp); I/B = 8%, O/B = 92% |

Boat Repair - per 1,000 square feet of floor area (assumed as Automobile Care Center, ITE Land Use 942)

| | |
|---|---|
| Daily Trips: | T = 12.50 (A) (estimated) |
| AM Peak Hour: | T = 2.94 (A); I/B = 65%, O/B = 35% |
| PM Peak Hour: | T = 3.38 (A); I/B = 50%, O/B = 50% |

| | | |
|---|---|---|
| Where: | A = Building Area in 1,000 sq. ft. | T = Trip Ends |
| | S = Number of Restaruant Seats | I/B = Inbound Trip Percentage |
| | Sl = Number of Boat Slips | O/B = Outbound Trip Percentage |
| | Sp = Number of Boat Dry Storage Spaces | |

* Note:
Per MdR LUP, or *Draft Traffic Study for the Marina del Rey Local Coastal Program Amendment* , Raju Associates, April 29, 2010.
All other trip generation rates per 8th Ed. ITE Trip Generation, unless noted.

Based on current traffic volume information provided by the Traffic and Lighting Division, southbound Admiralty Way adjacent to the project site currently carries a total of approximately 14,359 vehicles per day, including approximately 936 vehicles during the AM peak hour, and approximately 1,235 vehicles during the PM peak hour. Therefore, for purposes of this study, it was assumed that approximately 144 vehicles per day (1.0 percent of the existing 14,359 daily trips on southbound Admiralty Way) would patronize the project's proposed visitor-serving and/or marine-related retail uses as part of an existing trip past the site, resulting in a total of approximately 288 pass-by trips per day (144 inbound and 144 outbound), since each of the pass-by vehicles will produce one "entering" and one "exiting" trip. Similarly, it was assumed that a total of approximately 18 pass-by trips (9 inbound, 9 outbound) would occur during the AM peak hour, while a total of approximately 24 pass-by trips (12 inbound, 12 outbound) would be expected during the PM peak hour. Based on the ratio of the anticipated trip generation associated with the various proposed individual retail uses (described later in this section), the total number of pass-by trips were divided between the buildings housing these components.

A second factor affecting the potential trip generation characteristics of any particular land use is the "internal interaction" of patrons or employees of one use by another use within a particular development site (also known as "internal capture" or "multi-purpose trips"). While the LUP trip rates discussed earlier are assumed to account for pass-by trip adjustment factors, these rates were developed for the purpose of estimating the traffic generated by "stand-alone" land uses, and as such, do not include applicable reductions associated with multi-purpose trips to a site that includes a variety of different land uses. However, a review of the project indicates that none of the proposed uses would be expected to exhibit any notable internal interaction activity, and therefore, for purposes of this study, no "internal interaction" reductions were assumed.

Finally, use of available public transit can reduce the amount of traffic generated by a development, as employees or visitors utilize bus or other transportation modes to travel to and from the project site. As discussed in detail later in this document, Parcel 44 is served by a number of bus lines, both directly and within convenient walking distance of the site; transfers and other connections available from these site-serving bus lines allow patrons and employees of the project to use of public transit to travel throughout the greater Los Angeles region. However, a review of both the existing and proposed uses at the project site indicates that none of the uses would be expected to exhibit any significant use of public transit, and as such, no additional transit utilization was assumed for either the existing uses or proposed project components beyond that intrinsically assumed in the LUP or ITE trip generation rates.

Therefore, using the baseline “Marina-specific” (LUP) and ITE stand-alone trip generation rates summarized in Table 1, adjusted to account for the effects of pass-by activity associated with the proposed retail components, the trip generation estimates for the new project uses was estimated. However, as described earlier in this study, the project will also remove the existing uses currently operating at the site, and in turn, the existing trips associated with these uses will disappear. Therefore, the “new” project trips (generated by the proposed uses) will be partially offset by the removal of these existing trips, resulting in a “net” increase in traffic at the project site. The results of the “net new” project trip generation estimates are summarized in Table 2.

As shown in Table 2, once completed and occupied, anticipated by the end of the year 2016, the proposed project itself is expected to result in a total of approximately 4,551 daily trips, including approximately 134 trips (85 inbound, 49 outbound) during the AM peak hour, and approximately 451 trips (224 inbound, 227 outbound) during the PM peak hour, including reductions of approximately 114 daily trips, 8 AM peak hour trips (4 inbound, 4 outbound), and 10 PM peak hour trips (5 inbound, 5 outbound) to adjust for pass-by patronage of the proposed 13,795 square feet of visitor-serving retail components (Buildings V and VI), and additional reductions of approximately 174 daily trips, 10 AM peak hour trips (5 inbound, 5 outbound), and 14 PM peak hour trips (7 inbound, 7 outbound) to account for pass-by patronage of the proposed 25,000 square foot marine-related retail (West Marine, Building IV) uses.

However, the demolition of the existing on-site development will result in the removal of its associated trips from the “existing” area traffic volumes. As also shown in Table 2, the existing Parcel 44 site uses currently generate a total of approximately 798 daily trips, including 55 trips (32 inbound, 23 outbound) during the AM peak hour, and 64 trips (18 inbound, 46 outbound) during the PM peak hour; as described earlier in this section of the report, no pass-by activity is assumed to be associated with any of the existing uses occupying Parcel 44.

Therefore, accounting for the removal of the existing site-related trips, as well as incorporating the effects of pass-by patronage for the visitor-serving and/or marine-related retail components of the new development (those fronting on Admiralty Way), the proposed project is anticipated to result in a net increase in Parcel 44 site-related traffic of approximately 3,753 net daily trips, including approximately 79 net trips (53 inbound, 26 outbound) during the AM peak hour, and approximately 387 net trips (206 inbound, 181 outbound trips) during the PM peak hour. This net trip generation was used to evaluate the potential impacts of the proposed project on the surrounding street and highway network, as discussed in the following sections of this report.

**Table 2**
**Project Trip Generation Estimates**

| Size/Use | | Daily | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|
| **Proposed Project** | | | | | | | | |
| 13,795 sq. ft. | Visitor-Serving Retail | 592 | 9 | 5 | 14 | 30 | 31 | 61 |
| | (Less 40% of Total Pass-by Trips) [1] | (114) | (4) | (4) | (8) | (5) | (5) | (10) |
| Subtotal Visitor-Serving Retail Trips | | 478 | 5 | 1 | 6 | 25 | 26 | 51 |
| 25,000 sq. ft. | Marine-Related Retail (West Marine) | 1,074 | 15 | 10 | 25 | 54 | 57 | 111 |
| | (Less 60% of Total Pass-by Trips) [1] | (174) | (5) | (5) | (10) | (7) | (7) | (14) |
| Subtotal Marine-Related Retail Trips | | 900 | 10 | 5 | 15 | 47 | 50 | 97 |
| 9,855 sq. ft. | Restaurant(s) (382 total seats) | 1,093 | 6 | 5 | 11 | 64 | 32 | 96 |
| 700 sq. ft. | Boat Repair Offices | 9 | 1 | 1 | 2 | 1 | 1 | 2 |
| 69 boat | Dry and/or Mast-up Boat Storage | 23 | 2 | 1 | 3 | 0 | 3 | 3 |
| Subtotal Boat Repair/Boat Storage Trips | | 32 | 3 | 2 | 5 | 1 | 4 | 5 |
| 13,625 sq. ft. | Supermarket | 1,393 | 30 | 19 | 49 | 73 | 70 | 143 |
| 5,133 sq. ft. | Boat Brokers Offices | 57 | 7 | 1 | 8 | 2 | 9 | 11 |
| 9,170 sq. ft. | General Offices | 101 | 12 | 2 | 14 | 3 | 17 | 20 |
| 2,285 sq. ft. | Marine Administrative Offices | 25 | 4 | 0 | 4 | 1 | 4 | 5 |
| 1,150 sq. ft. | Yacht Club | 26 | 1 | 1 | 2 | 1 | 1 | 2 |
| 840 sq. ft. | Community Room/Boater Lounge | 19 | 1 | 0 | 1 | 0 | 1 | 1 |
| 148 -slip | Boat Slips | 427 | 6 | 13 | 19 | 7 | 13 | 20 |
| 1,700 sq. ft. | Boater Bathrooms and Laundry (total) | - - - - - - - - - - - - - - ancillary - - - - - - - - - - - - - - | | | | | | |
| *Subtotal New Project Trips* | | *4,551* | *85* | *49* | *134* | *224* | *227* | *451* |
| **Less Existing Site Uses** | | | | | | | | |
| 7,844 sq. ft. | Boat Brokers Offices (total) | 86 | 11 | 1 | 12 | 3 | 14 | 17 |
| 1,000 sq. ft. | Boat Repair (Seamark) | 13 | 2 | 1 | 3 | 2 | 1 | 3 |
| 4,216 sq. ft. | General Offices | 46 | 6 | 1 | 7 | 2 | 7 | 9 |
| 1,080 sq. ft. | Yacht Club | 25 | 1 | 1 | 2 | 1 | 1 | 2 |
| 205 -slip | Boat Slips | 591 | 9 | 17 | 26 | 10 | 18 | 28 |
| 111 boat | Dry Boat Storage | 37 | 3 | 2 | 5 | 0 | 5 | 5 |
| 584 sq. ft. | Boater Bathrooms | - - - - - - - - - - - - - - ancillary - - - - - - - - - - - - - - | | | | | | |
| *Subtotal Existing Site Trips* | | *798* | *32* | *23* | *55* | *18* | *46* | *64* |
| **Total Net New Parcel 44 Site Trips** | | **3,753** | **53** | **26** | **79** | **206** | **181** | **387** |

Note:

[1] Pass-by trips estimated at 1% of SB traffic passing project site on Admiralty Way (14,359 daily, 936 AM, 1,235 PM).

**Project Geographic Trip Distribution**

Next, the general geographic distribution of the project trips was identified, based primarily on a review of existing travel patterns in the general site vicinity, although local and regional demographic information was also researched to provide data on the relative distribution of population from which employees and patrons of the proposed project's component facilities would be drawn. This information was used to estimate the overall geographic distribution of project trips throughout the local area and surrounding region, which is summarized in Table 3. For purposes of this analysis, it was assumed that the general geographic trip distributions shown in Table 3 are representative of both the AM and PM commute peak hours, and that the existing and proposed site uses exhibit the same general geographic trip distributions.

**Table 3**
**Project Geographic Trip Distribution Percentages**

| Direction | Percent |
|---|---|
| North | 35% |
| South | 35% |
| East | 20% |
| West | 10% |
| Totals | 100% |

**Project Traffic Assignment**

Using the general geographic directional trip distribution percentages shown in Table 3, the approximate percentages of trips associated with both the existing site development and the proposed project's component uses on the key streets and freeway facilities in the project vicinity while traveling to or from the project site were determined, and are shown in Figure 4.

The general traffic assignments shown in Figure 4 were then further refined to identify the specific movement of project traffic through each of the study intersections as it travels to and from the project site; this level of detail is necessary in order to assess the project's traffic effects at each location. This step considered a number of factors that could influence the project traffic's access routes and travel patterns, including turn restrictions at several of the study intersections and the locations and operations of the project-serving driveways, as described in more detail in the following paragraphs.


FIGURE 4

PROJECT GEOGRAPHIC TRAFFIC DISTRIBUTION PERCENTAGES

Hirsch/Green Transportation Consulting, Inc.

As described earlier, each of the project site-adjacent roadways, Admiralty Way, Bali Way, and Mindanao Way, currently exhibit raised median islands along the length of the project frontages. Both Bali Way and Mindanao Way exhibit existing openings in the median islands that permit left-turns into and out of the Parcel 44 site. Although some modification of the locations and/or sizes of these existing median openings may be necessary in order to align with the proposed project's new driveways (as described in detail later in this report), for purposes of identifying the traffic patterns associated with the new development for this analysis, each of the proposed new project driveways accessing either Bali Way or Mindanao Way is expected to allow for both left-turn and right-turn entry and exit movements.

Conversely, while there is an existing median island opening on Admiralty Way adjacent to the project's proposed new driveway, this median opening currently exhibits only a left-turn pocket for southbound travel, to allow left-turns both into and out of an existing driveway serving the medical/commercial office development opposite Parcel 44, on the east side of Admiralty Way. However, this median island opening does not currently provide a left-turn pocket to facilitate northbound Admiralty Way traffic entry into the proposed project's new driveway; it is of note that northbound left-turns (or more accurately, northbound u-turns, since there is currently no Parcel 44 driveway adjacent to the existing median island opening) are not specifically prohibited at this location, but must make an undesirable turn from the innermost "through" travel lane (without benefit of a turn pocket), which can block or impede other northbound through traffic utilizing this lane. Similarly, while left-turn exits from the Parcel 44 site to northbound Admiralty Way are not technically prohibited, this move does not currently occur since no site driveway exists at the location of the existing median island opening.

As noted earlier, the project's proposed new Admiralty Way driveway will be located opposite the existing median island opening, and project-related traffic could physically enter and exit the site via this existing median island opening. However, due to the current configuration and operation of the median island opening (with no northbound left-turn lane), it is anticipated that both left-turn entry and left-turn exits (from and to northbound Admiralty Way, respectively) at this new project driveway would be prohibited due to safety and operational concerns.

Therefore, the project includes a modification to the Admiralty Way median island (adjacent to the new driveway) to provide a new left-turn pocket in the median island at the existing opening, to facilitate left turns from northbound Admiralty Way into the project site without impeding other northbound through traffic. Preliminary reviews of the conceptual median island modification by both the County's Department of Public Works, and the Department of Beaches and Harbors indicate that constructing a new left-turn pocket within the existing median island to allow northbound left-turns into the project's new driveway at this location would be acceptable. However, both Departments also recommended that exiting left-turns from the new project driveway onto northbound Admiralty Way should be prohibited, in order to minimize potential conflicts with other vehicles entering or exiting the project site, reduce the potential for such conflicts to create vehicular queues either internal to the site or along Admiralty Way, and to eliminate conflicts with exiting vehicles turning left onto southbound Admiralty Way from the existing medical/commercial office development driveway. To address this recommendation, the project's Admiralty Way driveway design includes a raised triangular island to physically prevent left-turn exits and to direct all outbound project traffic onto southbound Admiralty Way; project patrons and employees wishing to travel north on Admiralty Way upon leaving the site will exit via one of the new project driveways on either Bali Way or Mindanao Way, then make a turn left at the signalized intersections at Admiralty Way to proceed north along that roadway.

Based on the site access assumptions and other factors described above, the project-related traffic turning movement assignment percentages at each of the 25 study intersections were identified. Again, as with the general geographic trip distributions discussed earlier, for purposes of this analysis, the basic project trip assignment percentages at each of the study intersections were assumed to be the same for both the AM and PM peak hours. However, a review of the proposed project's individual component uses, as well as a comparison of these uses to the existing site development, indicates that it is likely that each of the project's components would access the site using different driveways, depending on the proximity of their destination use to any of seven proposed driveways. Similarly, since the existing Parcel 44 site driveway locations are different from those of the proposed project, these current uses would also be expected to exhibit somewhat different site access patterns from the project's uses. While these individual site access variations would not affect the general travel patterns to and from the project vicinity, as shown in Figure 4, they would affect how patrons or employees travel through the study intersections nearest the project site as they orient themselves to enter or exit the project site via the most convenient driveway. Specifically, the six intersections of Admiralty Way and Bali Way (no. 14), Lincoln Boulevard and Bali Way (no. 15), Admiralty Way and Mindanao Way (no. 16), Lincoln Boulevard and Mindanao Way (no. 17), Admiralty Way and Fiji Way (no. 21), and Lincoln Boulevard and Fiji Way (no. 22), would be expected to exhibit slightly different "inbound" or "outbound" trip percentages as compared to each other.

Therefore, intersection-level turning movement trip assignment percentages were developed individually for each of the project's major component buildings or uses (Building II, Building IV, Buildings V and VI, Building VIII, and boat slips; Buildings I, III, and VII are boater restrooms that are ancillary to the project's primary uses, and do not generate any independent traffic). These trip assignments reflect the unique site access travel routes for each major project component use at the six intersections identified earlier. The trip assignment percentages for the traffic associated with the existing site uses were also identified separately, to account for differences between the current and proposed site access locations and operations.

The final step in the traffic assignment process identified the number of project component and existing use trips traveling through each of the 25 study intersections using their individually identified travel routes. This was accomplished by multiplying the AM and PM peak hour project component or existing use trips shown previously in Table 2 by the appropriate inbound or outbound intersection turning movement percentages for each use. Note that the assignment of trips for the project's Building IV, and for Buildings V and VI (which together are considered as one component) include the pass-by trip reductions described earlier. Additionally, the trips associated with the existing Parcel 44 site uses were combined, and assigned as a single entity.

The resulting individual AM and PM peak hour project component volumes were then added together to identify the amount of "total project trips" at each intersection (representing the number of trips resulting from the project itself) for both peak hours. Finally, the peak hour traffic generated by the existing site uses was subtracted from these values, to produce the net new project-related traffic additions to each of the 25 study intersections. The individual intersection-level traffic assignment percentages for the project component and existing uses, along with the AM and PM peak hour project component and existing uses traffic volumes, and the "total proposed project-only trips" volumes, are contained in Appendix A of this report.

The results of this project traffic assignment process provide the level of detail necessary to conduct the traffic analysis and to identify the potential incremental project-related traffic impacts at the study intersections. The "total net" project traffic volumes, representing the sum of the traffic expected to be generated by the total of the proposed project's component uses less those trips associated with the existing site uses, which will be removed, are shown in Figure 5(a) for the AM peak hour, and in Figure 5(b) for the PM peak hour. The volumes identified in these figures represent the incremental project traffic additions used in this analysis to identify the potential project-related traffic impacts at each of the 25 study intersections.


NOTE: SEE SITE PLAN FOR ACTUAL DRIVEWAY CONFIGURATIONS

FIGURE 5(a)

PARCEL 44
TOTAL NET NEW SITE-RELATED PROJECT TRAFFIC VOLUMES
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.


FIGURE 5(b)

PARCEL 44
TOTAL NET NEW SITE-RELATED PROJECT TRAFFIC VOLUMES
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

## Project Parking and Access

*Project Parking Requirements*

The Los Angeles County Zoning Code, which is also applicable to developments located within Marina del Rey, identifies that on-site vehicular (automobile) parking shall be provided at a ratio of 4.0 vehicular parking spaces per 1,000 square feet of floor area for most typical “retail” uses, and 2.5 vehicular parking spaces per 1,000 square feet for offices and other commercial uses, while “restaurant” uses (including cafes and coffee shops) require 1.0 vehicular parking space for every three seats, based on their anticipated maximum occupancy, and including “kitchen” and “back of house” areas. The maximum occupancy for restaurants is typically estimated at one person for each 45 square feet for dining areas, and at one person for each 200 square feet for kitchen/back of house areas. Boat slips are required to provide vehicular parking at a ratio of 0.6 parking spaces per slip, while boat storage facilities require 0.3 vehicular parking spaces for each boat storage space. The Zoning Code does not specify vehicular parking requirements for uses such as the proposed yacht club, community room, or boater lounge/laundry facilities. Therefore, for purposes of this analysis, each of these uses was assumed to exhibit the same vehicular parking requirement as typical “retail” uses, at 4.0 spaces per 1,000 square feet.

In addition to the vehicular parking requirements noted above, the County’s Zoning Code also includes requirements for the provision of both long-term and short-term on-site bicycle spaces; long-term bicycle parking spaces are intended for use for periods of two hours or longer, such as by a project’s employees, while short-term bicycle spaces are generally utilized for periods of less than two hours, and are intended to accommodate project patrons or visitors. The current Zoning Code requires that long-term bicycle parking for most of the project’s proposed uses, including the general retail, supermarket, and restaurant components, be provided at a ratio of 1.0 space per 12,000 square feet of gross floor area, while short-term bicycle parking is to be provided at a ratio of 1.0 space per 5,000 gross square feet. Long-term bicycle parking for “office” uses are required at a ratio of 1.0 space per 10,000 square feet of gross floor area, with short-term bicycle parking to be provided at a ratio of 1.0 space per 20,000 gross square feet; regardless of the parking ratios noted above, a minimum of two long-term and two short-term bicycle spaces are required for all of the commercial uses proposed for the Parcel 44 project.

Based on the parking ratios and assumptions described above, the amount of vehicular and bicycle parking required for each of the project’s individual component uses, as well as for the entire development itself, was calculated, and is summarized in Table 4.

**Table 4**
**Los Angeles County Zoning Code Vehicular and Bicycle Parking Calculations**

| Proposed Project Component Use | Project Component Size | | Vehicular Parking Requirement | Spaces Required |
|---|---|---|---|---|
| Retail Uses (total) [1] | | 53,960 sq. ft. | 4.0 / 1,000 sq. ft. | 216 |
| Restaurant Uses | | | | |
| Indoor Dining Area (total) | 267 seats | 4,000 sq. ft. | 1.0 / 3 seats | 89 |
| Outdoor Dining Area (total) | 115 seats | n/a | 1.0 / 3 seats | 38 |
| Kitchen/Back of House (total) | 30 persons | 5,855 sq. ft. | 1.0 / 3 persons | 10 |
| | | | Total Restaurant Parking | 137 |
| Office and Other Commercial Uses [2] | | 16,588 sq. ft. | 2.5 / 1,000 sq. ft. | 41 |
| Yacht Club | | 1,150 sq. ft. | 4.0 / 1,000 sq. ft. | 5 |
| Boater Bathrooms/Laundry | | 1,700 sq. ft. | n/a (ancillary) | 0 |
| Boat Slips | 148 slips | n/a | 0.6 / boat slip | 89 |
| Boat Dry/Mast-up Storage | 69 spaces | n/a | 0.3 / space | 21 |
| **Total Project Vehicular Parking Required** | | | | **509** |
| **Vehicular Parking Requirement Reduction** (5% for provision of "above code" bicycle parking) | | | | **(25)** |
| **Adjusted Total Project Vehicular Parking Required** | | | | **484** |

Notes:
[1] Includes 13,795 sq. ft. visitor-serving retail; 25,000 sq. ft. West Marine; 13,625 sq. ft. specialty market; 700 sq. ft. boat repair; and 840 sq. ft. community room/boater lounge.
[2] Includes 5,133 sq. ft. Boat Brokers office; 2,285 sq. ft. Marine Administrative Office; and 9,170 sq. ft. general office space.

| Proposed Use/Size | | Bicycle Parking Requirement (Spaces/Unit Area) | | Bicycle Parking Required | |
|---|---|---|---|---|---|
| | | *Long-Term ** | *Short-Term ** | *Long-Term* | *Short-Term* |
| 63,815 sq. ft. | Total Retail and Restaurant Uses | 1.00 /12,000 sq. ft. | 1.00 /5,000 sq. ft. | 5 spaces | 13 spaces |
| 16,588 sq. ft. | Total Office/Commercial Uses | 1.00 /10,000 sq. ft. | 1.00 /20,000 sq. ft. | 2 spaces | 2 spaces |
| 1,150 sq. ft. | Yacht Club | 1.00 /12,000 sq. ft. | 1.00 /5,000 sq. ft. | 2 spaces | 2 spaces |
| 1,700 sq. ft. | Boater Bathrooms/Laundry (total) | n/a (ancillary) | n/a (ancillary) | 0 spaces | 0 spaces |
| 148 -slip | Boat Slips | n/a | n/a | 0 spaces | 0 spaces |
| 69 -boat | Dry/Mast-up Boat Storage | n/a | n/a | 0 spaces | 0 spaces |
| | | Subtotal Bicycle Parking Required | | 9 spaces | 17 spaces |
| | | | | 26 spaces | |
| | | Additional Bicycle Parking Provided (above required; for 5% vehicular parking requirement reduction, at 2 bicycle spaces per vehicle space) | | 0 spaces | 50 spaces |
| | | **Total Project Bicycle Parking Required** | | **9 spaces** | **67 spaces** |
| | | | | **76 spaces** | |

* Note: Minimum 2 long-term and 2 short-term bicycle parking spaces required per use.

As indicated in Table 4, the proposed project will require a total of approximately 509 vehicular parking spaces, including a total of approximately 216 spaces for the 53,960 total square feet of retail-related uses, a total of approximately 137 spaces for the 9,855 total square feet (total of 382 seats, including outdoor seating) of restaurant uses, approximately 41 total spaces for the 16,588 total square feet of office/other commercial uses, five (5) spaces for the yacht club use, and an additional 110 total parking spaces for the proposed boat-related uses (including both the waterside boat slips and the landside dry/mast-up boat storage uses). Additionally, the proposed project will be required to provide a total of approximately 26 bicycle spaces, including a total of nine (9) long-term and 17 short-term spaces; the majority of these bicycle spaces (approximately 18 spaces) are required for the proposed retail and restaurant component uses.

However, it is of note that in addition to the vehicular parking requirements noted above, the County's Zoning Code also includes provisions to allow for reductions in the number of required vehicular parking space, based on the provision of bicycle parking spaces in addition to the number otherwise required (at a ratio of two additional bicycle parking spaces for each of the vehicular parking spaces to be removed). Specifically, the Zoning Code permits a reduction in the number of required vehicular parking spaces of up to five percent (5%) of the total required spaces for a project if it provides more than the minimum number of required bicycle spaces, is located adjacent or proximate to an existing or proposed bicycle path, lane, route, or boulevard (as designated in the County Bicycle Master Plan), and is within one-half mile of a transit stop for a fixed rail or bus rapid transit or local bus system along a major or secondary highway (all three conditions must be met to qualify for the vehicular parking reduction). As described earlier in this report, the existing Marvin Braude Bike Path actually travels through the project site, and will be improved and enhanced as part of the proposed project's development. Additionally, as discussed later in this document, the Santa Monica Big Blue Bus ("BBB") Rapid 3 bus line operates along Lincoln Boulevard (designated as a Major Highway by the City of Los Angeles) through the project vicinity, including stops at Mindanao Way (for both northbound and southbound travel) approximately 150 feet east of the eastern edge of project site, well within the one-half mile distance required by the Zoning Code.

Therefore, since the proposed project meets both the bike path and bus transit proximity qualifications noted above, the project applicant has elected to exercise the option to reduce the number of required vehicular parking spaces by providing additional bicycle parking. The allowable maximum reduction in vehicular parking spaces of five percent equates to approximately 25 spaces (509 required vehicular spaces x 0.05), which will require the provision of an additional 50 bicycle spaces (two bicycle parking spaces for each vehicular parking space) above the 26 bicycle spaces already required. Note that the Zoning Code does not designate whether such additional bicycle spaces are to be designated as long-term or short-term spaces; for purposes of this analysis, all of the 50 additional (above Code required) bicycle spaces were assumed to be short-term spaces. As a result, as also shown in Table 4, following implementation of these vehicular and bicycle parking requirement adjustments, the proposed project will be required to provide a total of approximately 484 vehicular parking spaces and a total of approximately 76 bicycle parking spaces (nine long-term and 67 short-term spaces).

*Project Parking Supply*

The proposed project will provide a total of approximately 477 on-site vehicular parking spaces to serve its proposed uses, including approximately 282 standard (full-size) spaces (59 percent), 184 compact spaces (39 percent), and 11 handicap spaces (two percent). The Zoning Code allows a maximum 40 percent of a project's required parking to be provided as compact spaces (or up to approximately 191 spaces for the proposed project), and as such, the project will conform to that provision. Additionally, the Zoning Code requires that projects that require between 401 and 500 vehicular parking spaces (such as the proposed development) provide a minimum of seven (7) handicap parking spaces; at a total of approximately 11 handicap spaces, the proposed project will exceed that requirement by approximately four (4) spaces. Therefore, the project's proposed parking "breakdown" of standard, compact, and handicap parking spaces complies with the applicable Zoning Code requirements and/or policies. However, it should be noted that approximately 34 of the total 477 proposed parking spaces (about seven percent) are configured as tandem spaces; as shown previously in Figure 3 (Project Site Layout), these tandem spaces are located along the north and south sides of the site's Admiralty Way driveway and along the northern portion of the site's Admiralty Way frontage (east of Buildings V and VI). The use and operations of these tandem spaces is discussed in detail later in this report. Finally, although not specifically indicated in Figure 3, a total of 76 bicycle parking spaces will also be provided at a number of locations scattered throughout the project site.

Although the proposed project will meet the Zoning Code's requirement to provide a minimum of 76 bicycle parking spaces, the proposed 477-space vehicular parking space supply will be approximately seven (7) spaces deficient of the required 484 vehicular parking spaces identified in Table 4 (including the allowable reductions associated with the bicycle and transit provisions of the Zoning Code). However, it is important to note that the Zoning Code's vehicular parking requirements were designed to identify the anticipated "stand-alone" parking needs of retail and commercial land uses, including those contained in the proposed project, and as such, these parking ratios do not consider the potential beneficial effects on parking demands generally recognized to occur due to the integrated, mixed-use operations of the proposed development. Further, it is well known that most land uses exhibit variations in patronage and activity levels throughout the day, and as a result, the parking demands for these uses fluctuate as well, resulting in a dynamic parking demand profile rather than the static, maximum parking demand (requirement) value identified by the Zoning Code. The variability in parking demand is important in the ultimate determination regarding whether the proposed project will provide adequate parking, since the various retail, restaurant, and other commercial uses proposed for the project may not exhibit the same daily activity profiles, and as such, the peak parking demands of these various uses may not overlap. The potential offset of peak parking demands allows for a phenomenon known as "shared parking", where parking spaces designated for one land use are not fully utilized at all times of the day, and thus are available for use by other land uses on the same or adjacent sites, thereby potentially reducing the number of parking spaces needed to accommodate a project's parking demand. The generally beneficial effects of this type of parking interaction in reducing the overall parking requirements of new developments are well documented, and "shared parking" is recognized as a useful and appropriate parking assessment tool by many jurisdictions throughout the region, including Los Angeles County.

Therefore, in order to better evaluate whether the proposed project's parking supply is adequate to accommodate its anticipated parking demands, a supplemental shared parking assessment was prepared, based on methodologies and assumptions published in the current (2$^{nd}$) Edition of the Urban Land Institute's Shared Parking report[2]. The ULI data is based on surveys of parking activity for a variety of land uses located throughout California and across the country, including the retail, restaurant, and other commercial uses contained in the proposed project, and provides detailed hour-by-hour parking profiles for each use, identified as percentages of the maximum parking demand for each of the various uses. For purposes of this analysis, the maximum parking demands are assumed to equate to the Zoning Code "parking requirement" for each use, as shown earlier in Table 4. By applying the hourly parking demand percentages to the use's parking requirement, the actual parking needs for each use can be identified for any given time of the week. When these individual use parking demands are combined, the results provide a more realistic assessment of actual project parking demands. The supplemental

[2] *Shared Parking, Second Edition*, Urban Land Institute, Washington, D.C., 2005.

shared parking analyses for the proposed project, including a detailed discussion of the analysis methodologies and assumptions used, is provided in Appendix B of this report. However, the results of the evaluations, including identification of the anticipated hourly parking demands of the project for both typical weekday and weekend conditions, are summarized in Table 5.

**Table 5**
**Proposed Project Shared Parking Calculations**
**Typical Weekday and Weekend Conditions**

| | Weekdays | | | Weekends | | |
|---|---|---|---|---|---|---|
| Time of Day | Total Parking Demand | Total Parking Provided | Parking Surplus/ (Deficit) | Total Parking Demand | Total Parking Provided | Parking Surplus/ (Deficit) |
| 6:00 AM | 18 | 477 | 459 | 17 | 477 | 460 |
| 7:00 AM | 44 | | 433 | 34 | | 443 |
| 8:00 AM | 118 | | 359 | 80 | | 397 |
| 9:00 AM | 217 | | 260 | 172 | | 305 |
| 10:00 AM | 304 | | 173 | 223 | | 254 |
| 11:00 AM | 384 | | 93 | 284 | | 193 |
| 12:00 PM | 447 | | 30 | 360 | | 117 |
| 1:00 PM | 457 # | | 20 | 383 | | 94 |
| 2:00 PM | 441 | | 36 | 385 | | 92 |
| 3:00 PM | 399 | | 78 | 385 | | 92 |
| 4:00 PM | 407 | | 70 | 375 | | 102 |
| 5:00 PM | 428 | | 49 | 382 | | 95 |
| 6:00 PM | 433 | | 44 | 398 # | | 79 |
| 7:00 PM | 429 | | 48 | 394 | | 83 |
| 8:00 PM | 395 | | 82 | 374 | | 103 |
| 9:00 PM | 325 | | 152 | 317 | | 160 |
| 10:00 PM | 246 | | 231 | 242 | | 235 |
| 11:00 PM | 142 | | 335 | 171 | | 306 |
| 12:00 AM | 35 | | 442 | 69 | | 408 |

Notes:
# indicates peak weekday parking demand.
# indicates peak weekday parking demand.

As indicated in Table 5, the peak parking utilization for the proposed project is expected to occur during the weekday mid-day period between about 1:00 and 2:00 PM, with a total site-related parking demand of approximately 457 spaces, or about 20 spaces fewer than are provided, and resulting in a maximum on-site parking occupancy of approximately 96 percent. Additionally, during the approximately two-hour period from approximately 12:00 noon to 2:00 PM, the total parking demands for the project are expected to exceed the 443 “self-park” spaces provided (not counting the 34 tandem spaces), and therefore will necessitate use of approximately 20 of the tandem spaces to accommodate the anticipated parking demands during this period. However, as also shown in Table 5, throughout the remainder of the typical weekday activity, the total project parking demands are expected to be less than 443 spaces, and as such, use of tandem spaces will not be needed, and all project-related parking can be accommodated within the “self-park” spaces. Therefore, it is recommended that any valet or parking attendant assisted parking for the project be required only during the peak weekday parking activity periods identified in Table 5, from approximately 11:00 AM to about 3:00 PM.

Weekend project-related parking demands for the site are anticipated to be generally lower than for the weekday operations, due in part to reduced parking demands for the project’s office components, as well as due to greater differences in the hourly activity levels of the remaining retail and restaurant uses of the project, which allow for greater benefit due to shared parking. As also shown in Table 5, the peak weekend parking demands for the project are anticipated to occur somewhat later in the day than on weekdays, from approximately 6:00 to 7:00 PM, with a total of approximately 398 spaces (about 84 percent) of the parking expected to be utilized, or about 79 spaces fewer than are provided. As a result, the proposed project is anticipated to be able to accommodate its peak weekend parking demands throughout the entire day without need of the tandem spaces, and no valet or attendant-assisted parking will be required.

Additionally, the project’s overall vehicular parking supply is divided into several distinct parking areas within the site, to accommodate, to the extent feasible, the parking demands associated with the individual component uses (or combination of uses within the various buildings) in locations adjacent to or in close proximity to the intended users. As also shown earlier in the project site layout in Figure 3, approximately 109 vehicular parking spaces are provided in the site’s southwestern parking lot (designated as “Parking Area 1” in the shared parking analysis in Appendix B), located on Mindanao Way west of the Marvin Braude Bike Path and which is anticipated to primarily serve Building II (Trader Joe’s or similar specialty market), while approximately 164 additional vehicular parking spaces (including nine tandem spaces) are located in the parking area at the southeast corner of the project site (“Parking Area 2”), fronting Admiralty Way between Mindanao Way and the project’s new Admiralty Way driveway, and which is expected to primarily serve Buildings IV and V (housing West Marine, all of the proposed office space, including the Marine Administration Offices, approximately one-third of the general retail uses, and one of the proposed restaurants). Approximately 94 vehicular parking spaces (including the remaining 25 tandem spaces) are located in the parking area at the northeast corner of the site, fronting Admiralty Way between the new Admiralty Way driveway and Bali Way, with the final approximately 110 vehicular parking spaces provided in the site's northwestern parking lot along Bali Way (west of the Marvin Braude Bike Path); together, these areas (collectively designated as "Parking Area 3") provide a total of approximately 204 vehicular spaces, and are intended to serve Buildings VI and VIII, which house the remaining retail and restaurant uses (Building VI) as well as the proposed yacht club, boat repair, and boat dry/mast-up storage (Building VIII). Additionally, it should be noted that each of the three on-site parking areas described in this paragraph will also be utilized for parking for the 148 boat slips (to be developed under previously-approved CDP No. 5-11-131) included in the proposed redevelopment of the Parcel 44 site.

Locating adequate parking near its associated uses reduces the potential for "overparking" of individual parking lot areas within the project site, thereby reducing on-site traffic congestion as well as minimizing the walking distances for project patrons between their parking space and their on-site destination. As described in detail in the shared parking analyses in Appendix B, in addition to providing sufficient parking to meet the anticipated overall vehicular parking demands of the project, in general, each of the individual on-site parking areas will provide adequate vehicular parking to accommodate the needs of the individual project uses they are intended to serve, thereby reducing the potential for unnecessary on-site vehicular circulation within the project site as patrons search for convenient parking.

Therefore, based on the results of the supplemental shared parking analyses, despite exhibiting a slight (seven space) vehicular parking deficit compared to the Zoning Code requirements, the project will provide adequate parking to meet its estimated maximum parking needs at all times of the day for typical weekdays and weekends. As such, no project-related "overflow" parking into adjacent commercial or public parking areas or on nearby streets due to on-site parking shortages is anticipated, and no significant parking-related impacts are expected.

*Project Vehicular Access and Operations*

As shown previously in Figure 3 (Project Site Layout), and described in the preceding section of this report, the project will provide a total of approximately 477 on-site vehicular parking spaces, located within three separate parking areas spread throughout the site, including the "individual" parking lots fronting on Mindanao Way, on Admiralty Way, and on Bali Way. No direct, on-site vehicular access between these three individual parking areas is provided; access to the

“Mindanao lot” (Parking Area 1) is provided via two driveways along Mindanao Way (at the eastern and western ends of that parking area), while access to the “Admiralty lots” (which includes Parking Area 2 and the 94-space portion of Parking Area 3) is provided by a total of three driveways, including one each on Mindanao Way, Admiralty Way, and Bali Way. Finally, the “Bali lot” (containing the remaining 110 spaces in Parking Area 3) is generally served by a single driveway (located near the western end of the parking area), although it is of note that two additional driveways are also located slightly farther west on Bali Way, which provide access to the boat storage spaces provided at the far western edge of the project site; while less convenient than the designated “Bali lot” driveway, these additional driveways can also be used to access the vehicular parking spaces provided in the “Bali lot”.

Although the project’s vehicular access scheme is similar to the current site layout, with the exception of the proposed new left-turn entry capability from northbound Admiralty Way, a detailed examination of the operations of the project’s driveways was conducted to assure that the anticipated traffic demands of the project can be adequately accommodated. The traffic volumes at each of the project’s driveways were determined using the same individual project component traffic assignment percentages (contained in Appendix A) as described previously in the discussion of the assignment of project trips to the study intersections, combined with the appropriate individual project component peak hour trip generation estimates shown in Table 2. It should be noted, however, that the project’s driveway volumes are somewhat higher than the “net” project intersection-related trips identified previously for use in the analysis of the potential traffic impacts to the nearby study intersections, as described in the following paragraphs.

First, the pass-by trip reductions applied to the project’s Building IV, V, and VI retail components are not considered in the calculation of the project’s driveway volumes; pass-by trips, while not necessarily new project trips on the streets and intersections in the general area, will actually access the project site and are therefore part of the project’s overall driveway activity. Additionally, although appropriate for inclusion in the estimates of net project trips traveling through the surrounding intersections, the trip “credits” for removal of the traffic generated by the existing site development are not applicable to the estimation of project driveway trips, since the project’s driveways will accommodate the total traffic resulting from the anticipated new site uses, and not merely the difference between the future and existing site-related trips.

Therefore, the project’s net trip generation calculations shown previously in Table 2 were adjusted to remove the pass-by discounts assumed for the proposed retail uses, and to eliminate the trip credits associated with the removal of the existing site uses. As a result, the proposed project's total driveway volumes, representing the number of vehicles expected to actually enter and exit the site during the typical weekday peak hour periods, are expected to be approximately 4,839 daily trips, including approximately 152 trips (94 inbound, 58 outbound) during the AM peak hour, and approximately 475 trips (236 inbound, 239 outbound) during the PM peak hour. Based on these adjusted trip generation estimates, the anticipated peak hour project-related trips into and out of each of the site driveways were calculated, and are shown in Figure 6(a) for the AM peak hour, and in Figure 6(b) for the PM peak hour conditions.

As shown in Figure 6(a), project driveway volumes during the AM peak hour are expected to be relatively nominal, with a total of approximately 92 vehicles (56 entering, 36 exiting) using the project's three Mindanao Way driveways, approximately 40 total vehicles (31 entering, including 10 vehicles using the proposed new northbound Admiralty Way left-turn lane, and nine exiting) using the Admiralty Way driveway, and the remaining 20 vehicles (seven entering, 13 exiting) using the Bali Way driveways. The individual driveways exhibiting the highest volumes during this time period are the new Admiralty Way driveway (with a total of approximately 40 vehicles as noted above), the easternmost Mindanao Way driveway (serving West Marine and other commercial uses), accommodating a total of approximately 24 vehicles per hour (23 entering, 11 exiting), and the "middle" Mindanao Way driveway (serving the specialty market), which is expected to accommodate a total of approximately 37 vehicles (23 entering, 15 exiting); these three driveways therefore are expected to accommodate approximately 73 percent of the project's total driveway traffic during the AM peak hour.

During the PM peak hour, however, overall traffic generated by the proposed project will be higher than during the AM peak hour, and as such, the anticipated driveway utilizations will also increase. As shown in Figure 6(b), the project's three Mindanao Way driveways are expected to accommodate a total of approximately 261 vehicles (111 entering, 150 exiting), with a total of approximately 153 vehicles (109 entering, including 49 using the new northbound left-turn lane, and 44 exiting), and a total of 61 vehicles (16 entering, 45 exiting) using the Bali Way driveways. The highest-volume individual driveways during the PM peak hour are again expected to be the new Admiralty Way driveway (with a total of 153 vehicles as noted above), the easternmost Mindanao Way driveway, with a total of approximately 109 vehicles (35 entering, 74 exiting), and the middle Mindanao Way driveway, which is anticipated to accommodate a total of approximately 100 vehicles (51 entering, 49 exiting) during this time period. As such, similar to the AM peak hour, together, these three driveways are anticipated to be utilized by more than 76 percent of the project's total driveway traffic during the PM peak hour.

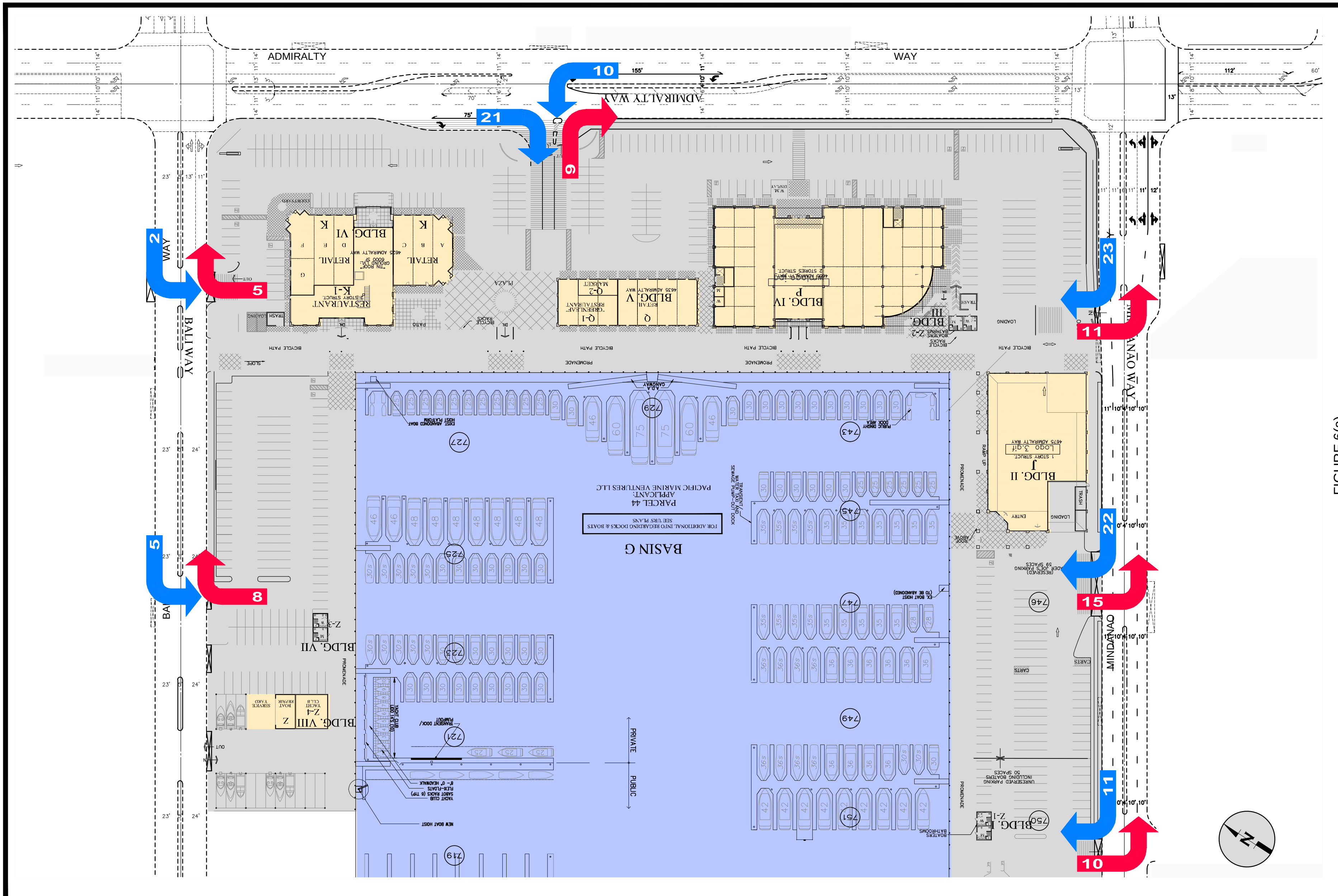


FIGURE 6(a)

TOTAL PROJECT DRIVEWAY VOLUMES
AM PEAK HOUR

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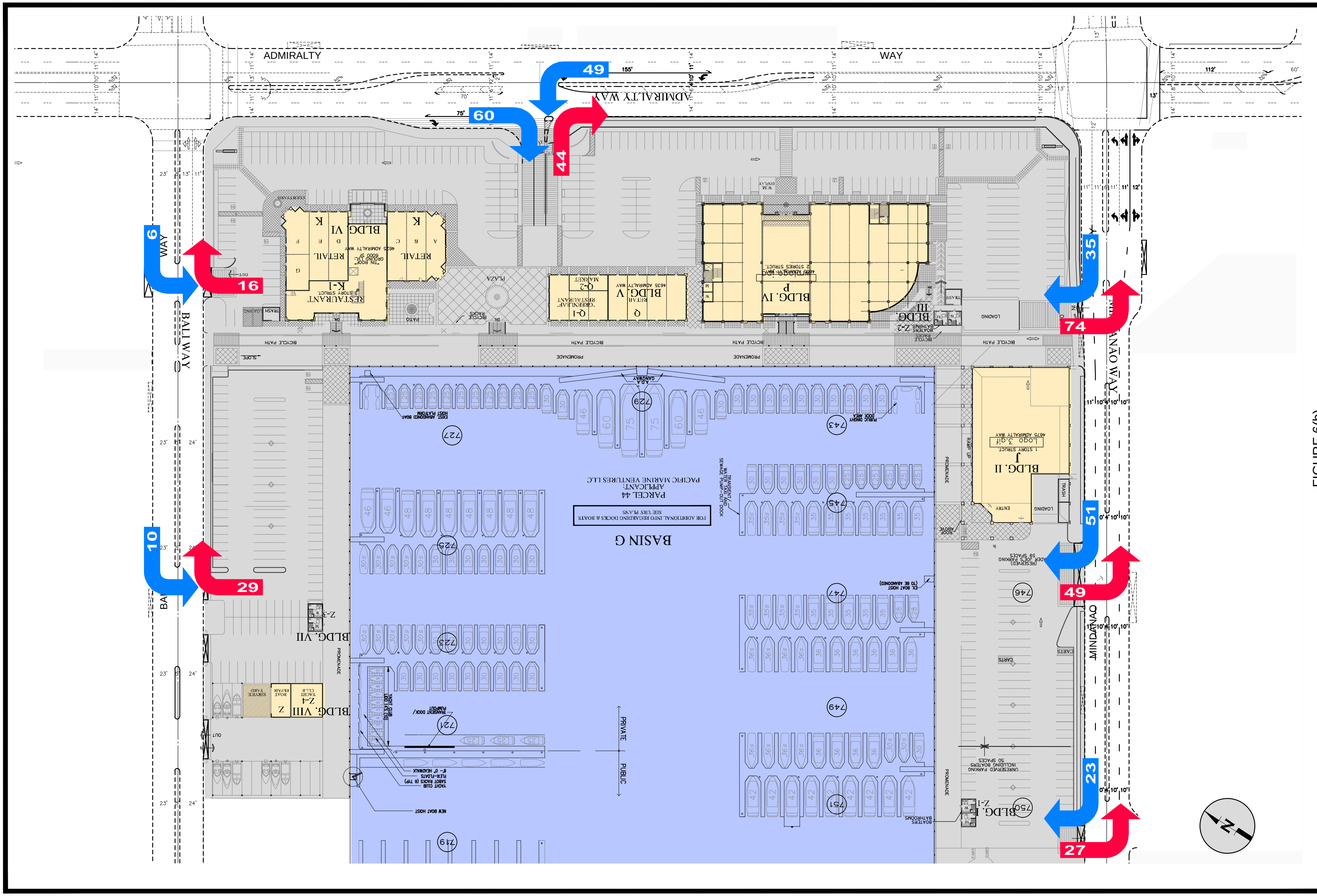



FIGURE 6(b)

TOTAL PROJECT DRIVEWAY VOLUMES
PM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.

In order to assure that the proposed new Admiralty Way driveway will permit the anticipated levels of inbound project-related traffic to cross the southbound Admiralty Way traffic stream (via the proposed new northbound left-turn movement), a supplemental "gap" study was prepared to evaluate the traffic flow conditions on Admiralty Way at the proposed driveway location for both the AM and PM peak periods. The gap study, contained in Appendix C of this report, identified the number and duration of gaps in the southbound traffic flows on Admiralty Way that could be used by vehicles attempting to make a northbound left-turn into this new project driveway, and to quantify the minimum number of vehicles that would be able to actually make this move. The details and results of the gap study, including a description of the analysis methodologies and assumptions associated with this supplemental analysis, and a summary of the observed vehicle gap data, are fully described in the appendix of this document. Those analyses indicated that, during the peak commute traffic periods (7:00 to 10:00 AM, and 4:00 to 7:00 PM) evaluated in this traffic study, there are sufficient gaps in southbound Admiralty Way traffic to accommodate a minimum of approximately 212 northbound left-turning vehicles per hour during the morning analysis period, and approximately 190 northbound left-turning vehicles during the afternoon/evening analysis period. Therefore, the proposed project's anticipated northbound left-turn traffic demands of approximately 10 vehicles per hour during the AM peak hour and approximately 49 vehicles per hour during the PM peak hour shown in Figures 6(a) and 6(b), respectively, can be easily accommodated under current traffic conditions in the project vicinity.

The project does not propose any type of access control, such as control arms activated by card keys or ticket dispensers, at any of the site driveway entrances. Typically, "uncontrolled" access driveways exhibit entry capacities of between 750 and 1,000 vehicles per hour per lane, depending on the configuration of the internal vehicular circulation and parking layout accessed by the driveway. Conversely, driveway exit capacities are primarily dependent upon the amount of traffic/congestion on the frontage streets, which generally control the number of vehicles that can enter into the traffic flow on the site adjacent streets, with most driveways exhibiting exit capacities of between 350 and 400 vehicles per hour. A review of the project's proposed driveway access locations and configurations indicates that each of the site's driveways provide adequate on-site "receiving" drive aisles to accommodate inbound traffic without significant internal conflicts or congestion, and as such, exhibit no factors that would substantially reduce the typical entry capacities noted earlier. Similarly, the existing traffic volumes on both Bali Way and Mindanao Way (discussed later in this report) are relatively low, and are not expected to significantly impede vehicles exiting the site along these frontages. Although traffic volumes along Admiralty Way can be heavy at times, and short periods of congestion are typical at some of the intersections in the project vicinity during the peak hours, as noted previously in the discussion of the operations of the project's Admiralty Way driveways, the right-turn only exit restrictions for this driveway will tend to allow for exit capacities at the higher end of the range. As such, each of the project's driveways is expected to exhibit exit capacities of between approximately 350 and 400 vehicles per hour. Since each of the proposed project driveways is configured with one entry and one exit lane, the "per lane" capacity values identified above were assumed to represent the "full" entry and exit capability of each driveway.

A review of the peak project driveway volumes shown in Figures 6(a) and 6(b) indicates that the total vehicular demand at any of the project's driveways for either inbound and outbound traffic will be substantially below the typical driveway capacity levels identified above during both the weekday AM and PM peak periods; hourly driveway traffic volumes at other times of the day are expected to be less than the values shown in Figures 6(a) and 6(b). Therefore, adequate entry capacity is provided to minimize the potential for on-street vehicular queuing, and similarly, driveway exit capacities are sufficient to accommodate the demands of the project without creating internal vehicular queues or on-site congestion, for both the individual driveways and for the proposed project in its entirety.

Finally, the operations of the proposed Building II semi-trailer truck loading dock were examined to determine whether such trucks can exit from the loading dock onto eastbound Mindanao Way in a single, continuous move (without having to back up to re-orient themselves, resulting in disruptions to both eastbound and westbound traffic on Mindanao Way, or having to exit to westbound Mindanao Way to ultimately turn around at the mole terminus of that roadway), while the ingress and egress movements for a passenger vehicle towing a boat trailer were evaluated for the project's Bali Way driveways serving the dry and mast-up boat storage areas. These evaluations are provided in Appendix D of this document. First, as shown in Figure D-1, a typical semi-trailer truck (48-foot trailer, approximately 69-foot total length) can exit the project driveway on Mindanao Way closest to the loading dock in a single move, although as also shown in this figure, the existing raised median island east of the proposed driveway will require modification to shorten it by approximately 40 feet (at the west end) to accommodate this move. However, as described in detail in the following section of this report, the project will be required by the County's Department of Beaches and Harbors to modify this and other medians along Mindanao Way in order to provide a second westbound lane along the project frontage, and as such, the additional modification to shorten this median is not expected to be a significant issue.

Further, as shown in Figure D-2(a) and D-2(b), a typical passenger vehicle towing a trailer containing an approximately 35-foot boat (the largest boat that can be accommodated in the dry/mast-up boat storage spaces) will be able to enter and exit either of the westernmost site driveways serving these uses in a single, continuous move, although as with the Mindanao Way driveway described earlier, the existing raised median islands along Bali Way at these locations (as well as at other site driveway locations along Bali Way) will require modification to provide new “openings” to permit the proposed entry and exit movements.

Therefore, based on the evaluations summarized in the preceding pages (and documented in detail in the appendices to this report), following implementation of the recommended modifications to the existing raised median islands along both the Mindanao Way and Bali Way frontages of the site, the proposed project’s vehicular access is expected to operate adequately, and no significant impacts with respect to driveway capacity, on-site vehicular circulation, or vehicular entry or exit operations are anticipated.

**Analysis of Future (2020) Admiralty Way Site Access Conditions**

As described in the preceding section, the gap study indicates that there are adequate gaps in the existing southbound traffic flows along Admiralty Way exist to accommodate the anticipated project-related traffic demands and that the proposed new northbound left-turn lane will operate acceptably without the need to install a new traffic signal at this location. However, as noted in the preceding discussions and analyses, anticipated future traffic growth in the project vicinity (including trips generated by the proposed project itself) could result in increasing congestion along Admiralty Way adjacent to the project site, potentially reducing or eliminating the ability of project-bound vehicles to make the proposed new northbound left-turn across southbound Admiralty Way traffic into the new project driveway along Admiralty Way without the aid of a traffic signal or other traffic-control device. Therefore, an additional analysis was conducted to determine whether the proposed new northbound left-turn would operate adequately in the future under the current (unsignalized) configuration, or if a new traffic signal would be required at this location to facilitate left-turns into the project site.

Following discussions with the County’s Department of Public Works Traffic and Lighting Division and the Department of Beaches and Harbors, it was determined that the supplemental analysis should examine the long-term operations not only of the proposed project’s new Admiralty Way driveway, but also evaluate the future operations of the area roadways and intersections in the immediate vicinity of the project. Therefore, based on the recommendations of both the Department of Public Works and the Department of Beaches and Harbors, this analysis was expanded to examine future traffic conditions in the immediate project vicinity anticipated by the year 2020, approximately four years after the expected completion of the proposed Parcel 44 redevelopment project. Note that the supplemental year 2020 analyses include the installation of both project-required roadway improvements to the site-adjacent intersections of Admiralty Way and Bali Way (as described in detail in the following section of this report), as well as programmed future improvements to these intersections either currently being constructed (dual southbound left-turn lanes at both locations) or recommended for installation in order to address potential future "cumulative" traffic impacts in the study area (described in the later "Ongoing and/or Programmed Future Highway System Improvements" and "Mitigation" sections of this this report, respectively).

The Department of Public Works requested that this additional analysis be prepared using a detailed traffic modeling program known as SYNCHRO, which evaluates not only the operations (volume-to-capacity ratios and levels of service) of specific intersections, but also provides information regarding corridor-level traffic flows, vehicular queuing and delays on various intersection approaches, and other pertinent data. In order to identify and analyze the operations of the subject intersection (Admiralty Way and the proposed project driveway), the SYNCHRO program requires traffic volume and geometric/operational data for other intersections surrounding the specified locations in order to accurately predict traffic flow patterns and volume demands at the intersections to be analyzed in detail. Therefore, for purposes of this supplemental SYNCHRO analysis, future year (2020) traffic volumes were identified for a total of seven intersections in the project vicinity, including Lincoln Boulevard at Marina Expressway, Bali Way, Mindanao Way, and Fiji Way, as well as for Admiralty Way at Bali Way, Mindanao Way, and Fiji Way.

The details of the supplemental year 2020 Admiralty Way project driveway access analysis are provided in Appendix C (along with the existing conditions gap study). However, to summarize those results, the SYNCHRO analyses indicated that the proposed new northbound left-turn on Admiralty Way into the new Parcel 44 driveway will operate acceptably under the cumulative year 2020 conditions, and that adequate gaps in southbound Admiralty Way traffic will continue to be available during both peak hours to accommodate the anticipated traffic demands of the proposed project. Average delays for project traffic using the new northbound left-turn lane will range from about 15 to 20 seconds (during the PM peak hour period), and no long-term queuing is forecast. As a result, this proposed new site access location will not require signalization.

The analyses also indicated that the County's programmed new southbound dual left-turn lanes at both Admiralty Way and Bali Way, and at Admiralty Way and Mindanao Way will adequately accommodate the forecast future traffic demands for those moves, and that no significant vehicular "spillover" into the through travel lanes on Admiralty Way at either location will occur, although during the PM peak hour, southbound vehicular queues on Admiralty Way could be sufficiently long to temporarily prevent left-turning vehicles from accessing these lanes. It should also be noted that the SYNCHRO analyses indicated that northbound vehicular queuing on Admiralty Way at Bali Way (from northbound vehicles stopped at the signal at Bali Way) could occasionally, although temporarily, back up sufficiently to block northbound access to the proposed new northbound left-turn lane (as well as access to the existing northbound left-turn lane at Bali Way) during both the AM and PM peak hours. As a result, it is recommended that "Keep Clear" signage and roadway markings be installed at the existing median cut on Admiralty Way to maintain clearance for vehicles using this access.

Therefore, the results of the long-term year 2020 analysis of traffic conditions indicate that the proposed new northbound left-turn access to the Parcel 44 site will adequately accommodate the project's anticipated traffic demands without need of a traffic signal or other traffic control device, although appropriate signage and/or pavement markings are recommended at the median cut to prevent blockages of this access location by vehicle queuing on northbound Admiralty Way at Bali Way. The supplemental SYNCHRO analyses also determined that, while typical peak commute period traffic volumes will result in some intermittent congestion in the project vicinity (as is the current condition), including at the site-adjacent intersections of Admiralty Way and Bali Way, and Admiralty Way and Mindanao Way, no significant traffic flow or intersection operational issues are anticipated. As such, no additional roadway or traffic signal improvements beyond those identified earlier in this report are necessary.

**Project-Required Roadway Improvements**

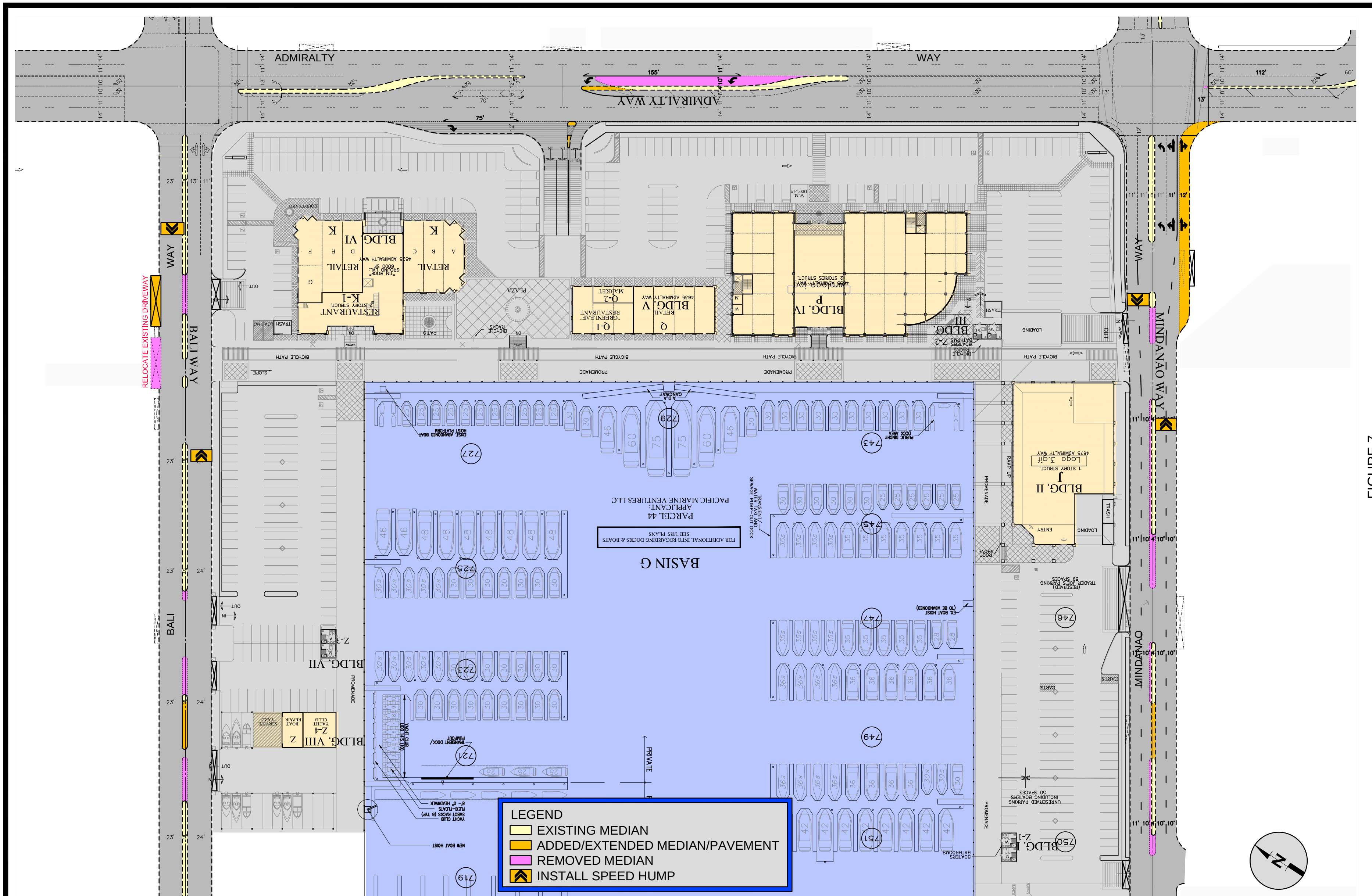
As briefly described earlier in this document, the project proposes a number of modifications to the roadway facilities fronting the site, including but not limited to the relocation or elimination of existing site driveways and modifications to the existing raised median islands adjacent to the project site in order to facilitate ingress and egress for project-related traffic. However, the County's Department of Public Works, and Department of Beaches and Harbors have each conducted a preliminary review of the proposed project, including its vehicular access plans, and have identified a number of additional improvements to the roadways or other transportation facilities adjacent to the project site that they believe will be necessary to ensure that acceptable street and intersection operations will be provided in the area following the completion of the proposed project (and other ongoing or proposed development in the vicinity).

The project's proposed median island and/or roadway modifications to the Admiralty Way, Mindanao Way, and Bali Way frontages of the site, along with the additional roadway and other infrastructure improvements identified by the County, are shown conceptually in Figure 7, and are discussed in detail in the following pages. Note that, pursuant to the County's request, in addition to the proposed project-related improvements, Figure 7 also includes the County's own improvements (currently under construction) to install new southbound dual left-turn lanes on Admiralty Way at both Mindanao Way and Bali Way, in order to provide a complete overview of the anticipated ultimate future roadway system in the project vicinity.

*Required Project Site Frontage Roadway Improvements*

The Parcel 44 project site exhibits frontages along each of three roadways; Bali Way on the north, Mindanao Way on the south, and Admiralty Way (between Bali Way and Mindanao Way) on the east. Bali Way adjacent to the project site, and in fact, throughout its length west of Admiralty Way, is currently improved to a total width of approximately 52 feet, including an approximately six-foot raised median island along much of its length between Admiralty Way and the mole terminus of the roadway separating two approximately 23-foot wide travel lanes; no sidewalks are provided along either side of Bali Way. No roadway dedications or street widenings are anticipated to be required along the project's Bali Way frontage.

Mindanao Way is currently improved to a total width of approximately 57 feet throughout most of its length west of Admiralty Way, including an approximately 20-foot wide, one-lane eastbound travel lane and approximately 18-foot wide, single-lane westbound travel lane separated by a six-foot raised median island; a five-foot sidewalk is generally provided along the north side of Mindanao Way (adjacent to the project frontage), with an eight-foot sidewalk provided along the south side of the roadway. However, near its intersection with Admiralty Way, Mindanao Way exhibits widenings along both its north and south sides, to provide a total improved width (including sidewalks and median islands) of approximately 60 feet. From its intersection with Admiralty Way to approximately 200 feet west, the eastbound roadway of Mindanao Way is widened to approximately 22 feet to provide a second travel lane in that direction through this segment, although the southern sidewalk is reduced in width by approximately three feet, from eight feet to five feet. Similarly, the westbound roadway is widened by approximately four feet




NOTE: SOUTHBOUND DUAL LEFT-TURN LANES ON ADMIRALTY WAY AT BALI WAY AND MINDANAO WAY CURRENTLY UNDER CONSTRUCTION

FIGURE 7

PARCEL 44
CONCEPTUAL OFF-SITE IMPROVEMENTS

HIRSCH GREEN
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to a total width of approximately 22 feet (again, to provide for two travel lanes) for approximately 150 feet west of Admiralty Way, then tapers for a distance of approximately 120 feet back to its typical 18-foot wide, single lane configuration for the remainder of its length; the northern sidewalk (along the project frontage) retains its 5-foot width throughout this widening and transitional-width area. As with the project's Bali Way frontage, no roadway dedications or street widenings are anticipated to be required along the site's Mindanao Way frontage.

Finally, Admiralty Way, located along the project site's eastern frontage, is currently improved to a total width of approximately 80 feet, including an approximately 70-foot total roadway width plus approximately five-foot wide sidewalks along both the east and west sides of the street. Adjacent to the project site (between Bali Way and Mindanao Way), Admiralty Way exhibits an approximately 33-foot wide, two-lane northbound roadway and an approximately 25-foot wide, two-lane southbound roadway; the northbound and southbound roadways are separated by an approximately 12-foot raised median island, although the island is reduced in width or eliminated altogether to provide for left-turn pockets at both Bali Way and Mindanao Way, as well as approximately mid-block between Bali Way and Mindanao Way, at the driveway for the existing medical office facility on the east side of the street. Similar to both the Bali Way and Mindanao Way site frontages, no roadway dedications or street widenings along the site's Admiralty Way frontage related to the overall roadway or sidewalk widths along Admiralty Way are anticipated, although the Department of Public Works has identified that the project will be required to improve the curb return radii adjacent to the project site at the intersections of both Admiralty Way and Mindanao Way, and Admiralty Way and Bali Way from 25 feet to 35 feet (including appropriate "corner cuts" to the right-of-way dedications to provide adequate sidewalk widths following the curb return improvements). Additionally, although not directly related to any required roadway width improvements, as described earlier (and shown previously in Figure 3), the proposed project includes the construction of a new, approximately 12-foot wide southbound deceleration lane (right-turn only lane) along a portion of its Admiralty Way frontage (north of the proposed new driveway) to provide for improved access for southbound traffic entering the project site, and to minimize potential interference with the southbound through traffic flows on Admiralty Way that could be caused by vehicles slowing to enter the project driveway.

*Site-Adjacent Project Access-Related Median Island/Roadway Improvements*

While no right-of-way dedications or roadway widenings are expected to be required along the project's Admiralty Way, Bali Way, or Mindanao Way frontages (with the exception of the southbound deceleration lane and curb return improvements on Admiralty Way noted above), as described earlier in this document, each of these roadways currently exhibits one or more raised median islands along their lengths adjacent to the project site. Although a number of “breaks” or openings in the median islands currently exist to allow vehicular traffic to enter or exit existing driveways on both sides of each of these roadways (accessing both the project site itself and non-project uses located on the opposite sides of the streets), the project’s proposed driveway locations along both Bali Way and Mindanao Way will require some modification of the existing median islands on both roadways in order to provide new openings to allow access into and out of the proposed site driveways, and/or to extend the medians to close existing openings adjacent to some of the existing site-serving driveways that will be removed as part of the project. The Department of Public Works and the Department of Beaches and Harbors have each expressed that such median island modifications are acceptable.

Additionally, the Department of Beaches and Harbors has indicated that the proposed project will be required to improve Mindanao Way to provide a second westbound travel lane along the full length of project site’s frontage, in order to accommodate the additional traffic anticipated to be generated by the proposed new development, particularly the proposed specialty market use to be located along Mindanao Way (in Building II). As described earlier in this report, the approximately 150-foot long segment of Mindanao Way west of Admiralty Way already provides two westbound lanes, although from that point westward, Mindanao Way narrows to provide only an approximately 18-foot wide, single-lane westbound roadway. In order to provide the required extension of the two westbound travel lanes to the project’s western boundary, the Department of Beaches and Harbors has indicated that it will allow the project applicant to narrow the Mindanao Way median islands along their northern sides by approximately two feet (from the existing six feet to four feet), thereby providing a minimum 20-foot westbound roadway and allowing Mindanao Way to be striped to provide two 10-foot westbound lanes along the project’s entire frontage. Further, the eastbound roadway of Mindanao Way should be striped to also provide two 10-foot travel lanes between the project’s western boundary and the existing two-lane segment of the roadway near Admiralty Way; the striping improvement to eastbound Mindanao Way will not require median island modifications.

Further, as described earlier in this document, the project proposes to modify the raised median island along Admiralty Way to provide a new northbound left-turn pocket into the project site opposite the proposed new site driveway at that location. This new northbound left-turn pocket will be installed at the southern end of the existing median island opening (which already provides a southbound left-turn pocket for access to the parking facilities serving the existing medical office and other commercial developments located opposite the proposed project on the east side of Admiralty Way); the new left-turn pocket will be designed to provide sufficient storage length (to the satisfaction of the County's Public Works Department) to accommodate the anticipated project-related vehicular demands without resulting in "spillover" queuing out of the turn pocket and disrupting traffic flows in the northbound through lanes of Admiralty Way.

*Additional County-Required Roadway/Infrastructure Improvements*

In addition to the typically required and/or proposed site frontage and access-related roadway and median island improvements associated with the development of the proposed project described in the preceding pages, the Department of Beaches and Harbors has indicated that the proposed project should be required to relocate the existing (non-project) access driveways to both Public Parking Lot No. 5 (on the north side of Bali Way west of Admiralty Way) and to the parking lot serving the Marina del Rey Visitor's Center (on the south side of Mindanao Way, also west of Admiralty Way) to align each of these existing driveways opposite the proposed project's new driveways. Further, in order to improve safety and minimize potential conflicts between vehicular traffic and bicyclists and pedestrians using the Marvin Braude Bike Path, the Department of Beaches and Harbors has requested that new speed humps or speed tables be installed in both directions on both Mindanao Way and Bali Way in advance of the bike path crossings of those roadways, along with appropriate signage.

Finally, the Department of Beaches and Harbors has also indicated that it will require the proposed project to widen the south side of Mindanao Way west of Admiralty Way, adjacent to the Marina del Rey Visitors Center, to install a new eastbound shared through/right-turn lane (and restripe the eastbound approach of Mindanao Way at Admiralty Way to convert the existing shared through/right-turn lane into a shared left-turn/through lane, in addition to the existing left-turn only lane). It is of note that this measure is part of the overall improvements to this intersection identified in the LUP's revised intersection improvements (which also includes the installation of dual southbound left-turn lanes on Admiralty Way and restriping of the westbound approach of Mindanao Way to convert the existing shared through/right-turn lane to allow both left-turns and right-turns along with the "through" move). Typically, the LUP roadway improvements are installed by the County (and funded by the traffic impact mitigation fees paid by development projects within the Marina, as described later in this document). However, due to concerns regarding potential additional traffic demands at this intersection associated with the proposed project, the County has indicated it will require the project to install the improvements to eastbound Mindanao Way prior to issuance of any certificates of occupancy for the project.

Although Figure 7 shows the conceptual roadway improvements proposed by the project and/or required by the County, detailed plans of these measures will be submitted to both the County's Department of Public Works, and Department of Beaches and Harbors for review and approval, with all agreed-upon improvements required to be completed, to the satisfaction of the County, prior to the issuance of any certificates of occupancy for any of the proposed project. However, since the improvements to the site-adjacent roadways described in the preceding pages will be required to be installed prior to the completion and occupancy of the proposed project, these measures were assumed to be "in place" as part of the "with project" conditions for both the "existing (year 2013)" and forecast "future (2016)" traffic impact analysis conditions, which are described in detail in a later section of this report.

## TRAFFIC IMPACT ANALYSIS STUDY AREA

### Environmental Setting

The Parcel 44 project site is located in the eastern portion of Marina del Rey, along the west side of Admiralty Way between Bali Way and Mindanao Way and surrounding the eastern portion of Basin G of the Marina, in Los Angeles County. The area surrounding the project site is currently developed with a variety of uses, primarily consisting of marine-related uses (including boat docks, boat sales and service/repair, and associated parking facilities), although several medical office facilities are located on the east side of Admiralty Way from just north of Bali Way to Mindanao Way, and the Waterside Shopping Center is located immediately to the southeast, along the east side of Admiralty Way between Mindanao Way and Fiji Way. Additionally, the Marina del Rey Hotel is located immediately west of the proposed project site at the mole terminus of Bali Way, and Burton Chace Park and its associated facilities surrounds the mole terminus of Mindanao Way directly west of the project site along that roadway. The Marina del Rey Visitors Center occupies the southwest corner of Mindanao Way and Bali Way adjacent to the project site, and the Mark Taber Branch of the Los Angeles Public Library is located a short distance north of the site along the west side of Admiralty Way. A number of other retail, commercial, and residential developments are also evident within Marina del Rey and the adjacent City of Los Angeles farther from the project site to the north, east, and south.

### Area Transportation Facilities

The area surrounding the proposed project is served by both local and regional transportation facilities. While not providing direct access to the site, the San Diego (I-405) Freeway, located approximately two miles to the east, and the Marina Freeway/Expressway (SR-90), accessible approximately one-quarter mile to the east via Mindanao Way, allow for easy regional access to and from the project area. Additionally, the area is served by a number of major and secondary arterials, along with a well-developed local street grid. The key transportation facilities in the project vicinity examined in this report are identified in the following pages.

*Freeways*

<u>San Diego (I-405) Freeway</u> – The most important north-south transportation facility through the study area, the San Diego Freeway serves the western portion of the Los Angeles basin from departure from the Golden State (I-5) Freeway in the San Fernando community of the City of

Los Angeles on the north to its reconnection to the Golden State Freeway in the City of Irvine in Orange County, approximately 70 miles to the south. This freeway generally provides five main line travel lanes per direction, although additional lanes are typically provided at surface street ramps or interchanges with other freeways. Within the project vicinity, the San Diego Freeway provides surface street access ramps at Venice/Washington Boulevards, Culver Boulevard, and Braddock Drive, allowing for relatively direct access to the project site. Additionally, this freeway provides an interchange with the Marina Freeway near the eastern terminus of that facility, although northbound-to-eastbound and westbound-to-southbound movements are not available.

<u>Marina Freeway/Expressway (State Route 90)</u> – Exhibiting a roughly east-west alignment, and containing both elevated and at-grade elements, the Marina Freeway/Expressway is a short sub-regional facility located approximately one-third of a mile to the south of the project site, and connects Slauson Avenue (east of Sepulveda Boulevard) on the east with Lincoln Boulevard on the west. The elevated (freeway) section of this facility, from just west of Culver Boulevard on the west to the Slauson Avenue terminus on the east, provides a three-lane per direction configuration, with additional lanes provided at the interchange with the San Diego Freeway. Surface street access ramps are provided only at Sepulveda Boulevard (to the eastbound Marina Freeway), at Centinela Avenue (full ramp set), and at Culver Boulevard (full ramp set). The at-grade (expressway) portion of the facility, from Culver Boulevard to Lincoln Boulevard, is developed with two lanes per direction, although localized flarings or striping improvements at the intersections with Culver Boulevard and Mindanao Way accommodate additional left and/or right-turn lanes. The Expressway portion of the facility is a divided roadway, with crossover traffic prohibited except at its intersections with Culver Boulevard and Mindanao Way.

*Major and Secondary Highways*

<u>Venice Boulevard</u> – This generally east-west oriented Major Highway is located at the northern edge of the study area, approximately one mile north of the project site, and provides a key connection through the study area between Pacific Avenue in the Venice community of the City of Los Angeles on the west and Main Street in the southern portion of downtown Los Angeles on the east, where it continues eastward as 16th Street before terminating at Hooper Avenue. Venice Boulevard exhibits a large raised median island through much of the study area, and is typically configured to provide two to three through lanes plus a dedicated bicycle/parking lane in each direction, along with exclusive left-turn channelization at major intersections. On-street parking is typically allowed along both sides of the roadway throughout the study area.

Lincoln Boulevard – A generally north-south oriented Major Highway, Lincoln Boulevard is located only a few hundred feet east of the project site, and provides a key access route between San Vicente Boulevard near the northern boundary of the City of Santa Monica and its terminus at Sepulveda Boulevard near the Los Angeles International Airport ("LAX"). In the project vicinity, Lincoln Boulevard serves as the eastern boundary between Marina del Rey and the adjacent City of Los Angeles from just south of the Marina Expressway to the Ballona Creek drainage channel to the south, and is generally developed to provide three peak hour travel lanes per direction at most intersections north of Fiji Way, but only two lanes per direction between Fiji Way and the Culver Boulevard overcrossing, where three lanes per direction are again provided. Left-turn channelization is provided at all intersections in the study area, and a raised median island exists on Lincoln Boulevard from Fiji Way north to the Marina Expressway intersection. On-street parking is prohibited on this portion of Lincoln Boulevard at all times, but is allowed on a time-restricted basis on both sides of the street north of Maxella Avenue, although peak hour parking restrictions are in effect on these segments in order to provide a third travel lane during the critical morning and evening commute periods.

Washington Boulevard – Another Major Highway facility, this generally east-west oriented roadway is located approximately one-half mile to the north of the project site, at the northern boundary between Marina del Rey and the City of Los Angeles. Washington Boulevard is a major transportation facility through the study area, providing uninterrupted service between Pacific Avenue on the west and the City of Whittier on the east, passing through the City of Culver City, the Mid-City and Harvard Heights communities and the southern portion of downtown Los Angeles, and the Cities of Vernon, Commerce, and Pico Rivera along the route. In the study area, Washington Boulevard typically provides two through lanes in each direction, plus a median two-way left-turn lane that converts to exclusive left-turn channelization at most cross streets, including dual left-turn pockets at Lincoln Boulevard. On-street parking is generally allowed along most segments of Washington Boulevard within the study area.

Culver Boulevard – Located approximately one-half mile south of the project site, this roadway provides an important connection between the coastal areas on the west and the northeastern portion of the City of Culver City to the easy, running generally northeast-southwest between Trolleyway, about two blocks west of Vista del Mar at the western edge of the Playa del Rey community of the City of Los Angeles, and Venice Boulevard, just west of Robertson Boulevard, in the City of Los Angeles near the Culver City border. Culver Boulevard is designated as a Major Highway throughout much of the City of Los Angeles, although it is downgraded to a

Secondary Highway west of Lincoln Boulevard, and ultimately to Local Street status for its final few blocks west of Vista del Mar. Within the immediate study area, Culver Boulevard generally exhibits one travel lane in each direction west of Lincoln Boulevard, one to two westbound and three eastbound lanes between Lincoln Boulevard and the Marina Expressway/Freeway, and two lanes in each direction east of the Marina Expressway/Freeway; on-street parking is prohibited along both sides of Culver Boulevard throughout the study area. Culver Boulevard provides both on and off-ramps with the Marina Expressway/Freeway, as well as limited access to Lincoln Boulevard (eastbound and westbound on to northbound Lincoln Boulevard and northbound Lincoln Boulevard to eastbound Culver Boulevard only).

Jefferson Boulevard – Another Major Highway facility, this generally east-west oriented roadway is located at the southern edge of the study area, approximately three-quarters of a mile to the south of the project site, and serves as an important connection through the region from its intersection with Culver Boulevard west of Lincoln Boulevard on the west to its eastern terminus at Central Avenue in South Los Angeles. Within the immediate study area, Jefferson Boulevard typically provides three westbound and three to four through lanes in each direction, separated by a raised median island, plus left-turn channelization at most cross streets along the portion of the roadway to the east of Lincoln Boulevard, but reduces to two lanes per direction (again separated by a raised median island) to the west of this facility. On-street parking is typically prohibited both sides of Jefferson Boulevard throughout the study area, with the exception of a short section west of Lincoln Boulevard, along the south side of the roadway adjacent to the Ballona Creek Freshwater Marsh preservation area.

Maxella Avenue – This east-west oriented roadway is located approximately one-quarter mile north of the project site, and provides localized service generally between its western terminus at Lincoln Boulevard on the west (opposite Marina Pointe Drive, a local access roadway serving an existing residential and commercial/retail development) and Centinela Avenue on the east, although the street is discontinuous McConnell Boulevard and Neosho Avenue in the City of Culver City. Maxella Avenue is designated as a Secondary Highway on its westernmost segment between Lincoln Boulevard and Glencoe Avenue, but is downgraded to Local Street status throughout the remainder of its length. Along the Secondary Highway portion of the roadway, Maxella Avenue provides two travel lanes in each direction plus a median two-way left-turn lane, and on-street parking is prohibited along both sides of the roadway in this area; the Local Street portions of Maxella Avenue typically provide a single travel lane per direction, with on-street parking generally allowed on both sides of the street.

Mindanao Way – Another east-west oriented Secondary Highway, Mindanao Way serves as the southern boundary of the Parcel 44 project site, and also provides localized access between Burton Chase Park and the Marina del Rey “Basin G” berths west of Admiralty Way in the Marina itself and Alla Road in the City of Los Angeles, where it becomes Short Avenue and continues eastward to its eventual terminus at Centinela Avenue. Mindanao Way provides the most direct access between the project site and the Marina Expressway/Freeway, with connections to both the eastbound and westbound at-grade roadways of this facility located approximately one-quarter mile from the site. West of Admiralty Way, including along the project frontage, Mindanao Way typically provides only a single travel lane in each direction, separated by a raised median island, while to the east of Admiralty Way, the roadway is typically striped to provide two lanes in each direction, with some sections widened to permit additional left-turn and or right-turn lanes, particularly at its intersections with the Marina Expressway and Lincoln Boulevard. On-street parking is typically not permitted on either side of Mindanao Way west of Glencoe Avenue, with the exception of an approximately 200-foot section on the south side of the street immediately south/west of La Villa Marina.

Glencoe Avenue – This north-south roadway is located approximately one-quarter mile east of Lincoln Boulevard, and provides a local connection generally between Washington Boulevard on the north and Alla Road on the south, turning to an east-west orientation at Alla Road, and continuing a short distance as Bonaparte Avenue, a Local Street. Glencoe Avenue is designated as a Secondary Highway between Washington Boulevard and Maxella Avenue, but provides only a single travel lane per direction, plus on-street parking. Between Maxella Avenue and Mindanao Way, Glencoe Avenue is downgraded to a Collector Street designation, but is widened to provide two travel lanes per direction, plus a median two-way left-turn lane and some on-street parking. Southeast of Mindanao Way, the roadway reverts back to a single travel lane per direction plus on street parking for the remainder of its length.

Pacific Avenue – Located at the western edge of the study area, Pacific Avenue provides the westernmost continuous north-south oriented roadway in the vicinity, and serves as a key alternative to Lincoln Boulevard between the northern portions of the City of Santa Monica and Marina del Rey. Throughout the City of Los Angeles, between approximately Navy Court near the City of Los Angeles/City of Santa Monica boundary and its southern terminus at Via Marina in Marina del Rey, just north of the Marina main channel, Pacific Avenue is designated as a Secondary Highway, generally providing one travel lane plus on-street parking in each direction. Within the City of Santa Monica, this facility, now named Neilson Way, is an arterial roadway, and changes names once again at Pico Boulevard to become Ocean Avenue before eventually terminating at Channel Road north of San Vicente Boulevard. This portion of the roadway typically provides two peak hour travel lanes per direction, although on-street parking is allowed during off peak travel periods, reducing some portions of the street to a single lane per direction.

Admiralty Way – This Secondary Highway is the primary transportation facility through the north and east portions of Marina del Rey, connecting Via Marina on the west and Fiji Way on the southeast, and providing the eastern boundary for the project site. Throughout its length, Admiralty Way is typically configured with a raised median island separating two through travel lanes per direction, although additional left-turn and/or right turn lanes are provided at most street and driveway intersections. On-street parking is prohibited on both sides of this roadway.

Via Marina/Ocean Avenue – A generally a north-south oriented roadway, the Via Marina portion of this facility is designated as a Secondary Highway, and provides local access to the western, primarily residential area of Marina del Rey, extending southward from Washington Boulevard (where it terminates opposite Ocean Avenue) to provide access to the Marina del Rey “Basin A” through “Basin D” areas, in addition to Ballona Creek. Via Marina provides two to three through lanes in each direction plus a raised median island and left-turn channelization at all intersections, with on-street parking prohibited along both sides of the street. North of Washington Boulevard, the street changes names to Ocean Avenue, a short Local Street that ultimately connects to Venice Boulevard on the north. Ocean Avenue provides only a single travel lane per direction, but on-street parking is permitted on both sides of the roadway.

*Collector Roadways*

Dell Avenue/Via Dolce – Another short arterial collector/local street combination, Dell Avenue also provides a local connection between Venice Boulevard and Washington Boulevard, traveling through the Venice Canals area, before changing names to become Via Dolce to the south of Washington Boulevard, where is continues a short distance as an arterial collector roadway serving the single-family and multi-family residential developments in this area of the Marina, before intersecting with and terminating at Via Marina opposite Marquesas Way. The Dell Avenue portion of this roadway provides a single travel lane in each direction on the short segment between Venice Boulevard and Washington Boulevard in the City of Los Angeles, while the Via Dolce segment within Marina del Rey generally provides two through lanes in each direction plus a striped median two-way left-turn lane. On-street parking is generally allowed on both sides of the street along both the Dell Avenue and Via Dolce segments of this facility.

*Local/Residential Streets*

Bali Way – This short Local Street provides the northern boundary of the Parcel 44 project site, and serves primarily as a local-access facility between Lincoln Boulevard and Admiralty Way and the Marina del Rey "Basin F" and "Basin G" areas. Bali Way is striped to provide three lanes per direction on the short segment between Lincoln Boulevard and Admiralty Way, but is unstriped and exhibits only a single lane in each direction, separated by a raised median island, to the west of Admiralty Way, including adjacent to the project site, although it is striped to provide two eastbound approach lanes at Admiralty Way.

Fiji Way – Another Local Street facility, Fiji Way is the southernmost roadway in the Marina, located approximately two-tenths of a mile south of the project site, and provides access to the existing "Fisherman's Village" retail/commercial development, a number of marine-related businesses (including boat storage, boat charters, and associated parking/pier facilities), the County's Department of Beaches and Harbors offices, existing residential development, and the U.S. Coast Guard Harbor Patrol station near the Ballona Creek "point". Within the Marina, west of Lincoln Boulevard, Fiji Way provides two westbound and one eastbound travel lanes, plus a bicycle lane in each direction. Similar to many other roadways in the Marina, it exhibits a raised median island along much of its length, with on-street parking prohibited along both sides of the roadway. Fiji Way "dead ends" a short distance to the east of Lincoln Boulevard; this segment, within the City of Los Angeles, provides a single lane in each direction plus on-street parking, and serves only as local access to several fronting businesses and multi-family developments.

Palawan Way – Located at the northern edge of the Marina, approximately one mile northwest of the project site along Admiralty Way, this short Local Street provides a connection from Washington Boulevard to the Mothers Beach area of the Marina, as well as to existing residential and commercial development to the south of Admiralty Way. Palawan Way generally provides two lanes per direction, separated by a raised median island, on the short segment between Admiralty Way and Washington Boulevard, although northbound Palawan Way reduces to a single right-turn only lane at the STOP sign controlled "tee" intersection with Washington Boulevard (the only unsignalized major intersection in the study area), while the southbound approach of Palawan Way at Admiralty Way (signalized intersection) provides three lanes, including a left-turn only lane, a through lane, and a right-turn only lane. South of Admiralty Way, Palawan Way provides only a single lane in each direction, although the raised median island is still present, and on-street parking is prohibited on both sides of the street.

*Public Transportation*

The Los Angeles County Metropolitan Transportation Authority ("Metro") has established an extensive grid system of public transit bus routes throughout the greater Los Angeles region, including the project vicinity, and several local jurisdictions including the cities of Los Angeles, Santa Monica ("Big Blue Bus", aka "BBB"), and Culver City also provide public transit services through the Marina del Rey study area. Several of these existing bus lines currently serve the project site directly, along Admiralty Way or Mindanao Way, or are located within convenient walking distance (less than one-quarter mile) along Lincoln Boulevard or Fiji Way. A map of the current bus transit service within the project vicinity is shown in Figure 8, and the key transit lines serving the project site and study area are described in more detail in the following pages.

<u>Metro Lines 108/358</u> – Both Line 108 (local-stop service) and Line 358 (limited-stop service) provide weekday service between the west side of Marina del Rey and the Pico Rivera area, with also Line 108 providing additional weekend and holiday service. Within the immediate study area, Lines 108/358 operates on a loop route through the Marina, traveling along Admiralty Way between Mindanao Way and Via Marina, including a stop located adjacent to the proposed Parcel 44 project site, then continues along Via Marina, Pacific Avenue, and Washington Boulevard before returning to Admiralty Way via Palawan Way. These lines then travel primarily along Mindanao Way/Short Avenue, Centinela Avenue, Jefferson Boulevard, and Slauson Avenue between Marina del Rey and Pico Rivera, serving the Fox Hills Mall, Culver City Transit Station (located adjacent to the mall parking lot), and office and residential developments east of Sepulveda Boulevard between Centinela Avenue and Slauson Avenue along the way. In the vicinity of the proposed project, Lines 108/358 operate between approximately 5:00 AM and 10:00 PM on weekdays, with peak period headways of approximately 15 to 20 minutes, although headways during the mid-day and other off-peak periods lengthen to upwards of 45 minutes. Weekend and holiday service (Line 108 only) is also provided during approximately the same time periods, although headways on these days range from about 30 minutes during the peak periods to one hour throughout the rest of the day.

<u>Commuter Express 437</u> – This local-stop bus line, a service of LADOT, provides weekday peak period commuter service between Marina del Rey and downtown Los Angeles, with one-way eastbound service during the morning commute periods, and return (westbound) service during the afternoon/evening periods. Line 437 begins at Pacific Avenue and Washington Boulevard, then travels south along Pacific Avenue to Via Marina, follows Via Marina to Admiralty Way, and

PARCEL 44 \ BUS-ROUTES

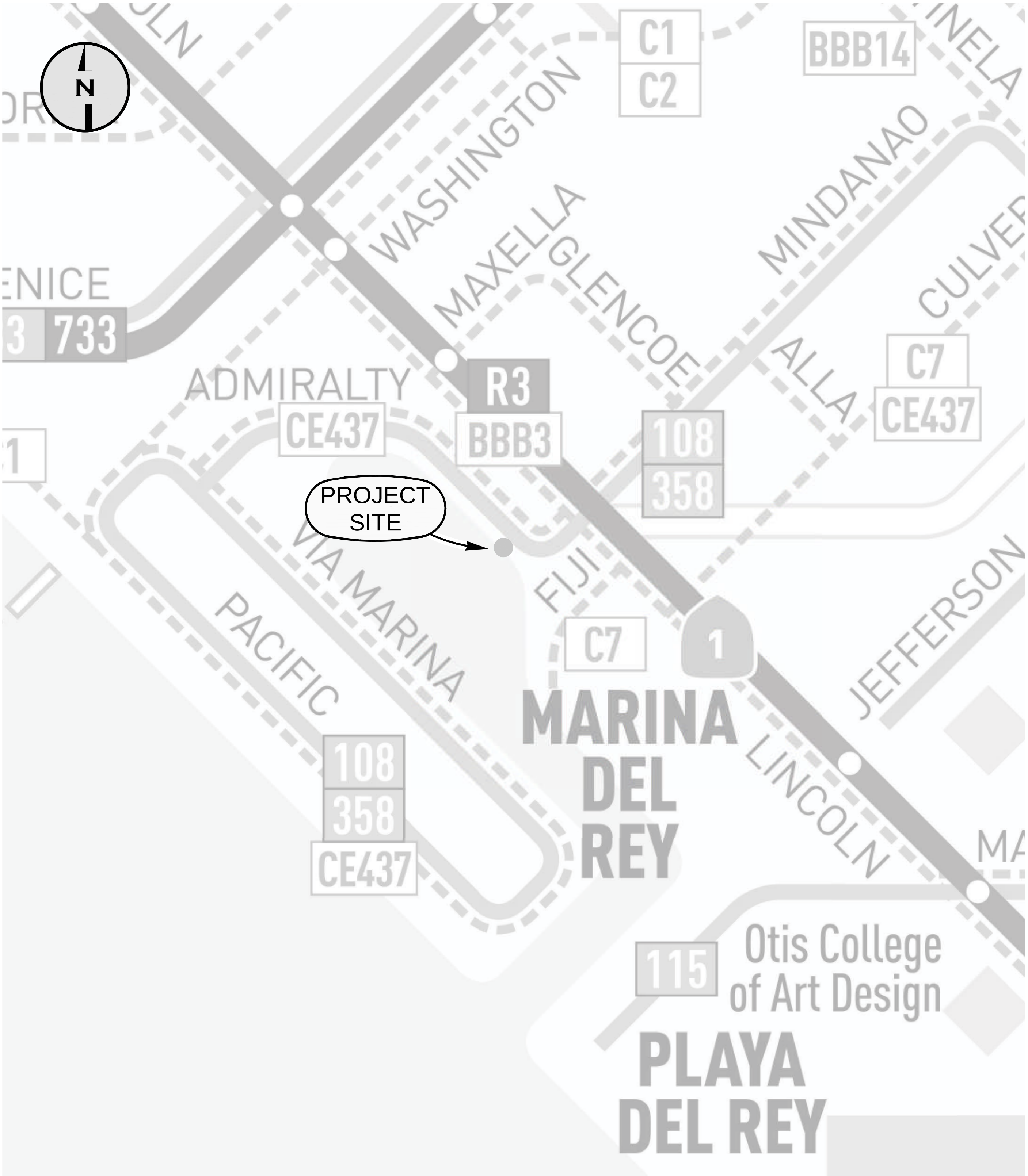


FIGURE 8

10/22/2013

HIRSCH GREEN

Hirsch/Green Transportation Consulting, Inc.

PROJECT AREA TRANSIT SERVICE MAP

then continues along Admiralty Way to Mindanao Way, providing stops at both Bali Way and Mindanao Way adjacent to the Parcel 44 project site. Line 437 then travels eastward out of the Marina, continuing along Mindanao Way to Alla Road, then south to Culver Boulevard, where it travels eastbound through Culver City before accessing the I-10 Freeway near Fairfax Avenue, to continue into downtown Los Angeles. Within downtown Los Angeles, Line 437 provides service along Grand Avenue, Olive Street, Flower Street and Temple Street, ultimately terminating at the Federal Building at Temple Street and San Pedro Street before returning to the Marina area during the afternoon/evening, generally along the reverse route. In the project vicinity, Line 437 provides departing (eastbound) buses at 15 to 20 minute headways between approximately 6:00 AM and 8:00 AM. Returning (westbound) buses serve the project vicinity approximately every 15 to 30 minutes between about 4:30 PM and 7:00 PM. No weekend or holiday service is available on this line.

Culver City Route 7 – Another weekday-only bus line, Route 7 provides local-stop service from just northeast of downtown Culver City to the Fisherman's Village area of Marina del Rey, near the western end of Fiji Way. Beginning with a loop along Culver Boulevard, Venice Boulevard, Robertson Boulevard, and Washington Boulevard in Culver City, Route 437 travels to and from Marina del Rey along Culver Boulevard. From near the Marina Expressway (SR-90), Route 7 then turns to travel along Alla Road, Mindanao Way, Glencoe Avenue, Maxella Avenue, and Lincoln Boulevard before entering Marina del Rey at Bali Way, where it provides a stop at the project-adjacent intersection of Admiralty Way and Bali Way. Route 7 then continues along Admiralty Way to Fiji Way, where it provides service to Fisherman's Village and the surrounding commercial, retail, restaurant, and residential developments before beginning its return to Culver City along the reverse route. In the immediate project vicinity, Route 7 typically provides eastbound service between approximately 5:30 AM and 6:30 PM, and westbound service between approximately 6:30 AM and 7:30 PM, with one-hour headways in both directions throughout the day; no weekend or holiday service is available via this route.

BBB Route 3 – This bus line provides weekday, weekend, and holiday service between the UCLA Campus in Westwood and the Metro Green Line Station at Imperial Highway and Aviation Boulevard to the southeast of the Los Angeles International Airport ("LAX"). Route 3 serves both the Hilgard and Ackerman Terminals at the UCLA campus, before traveling along Westwood Boulevard, Wilshire Boulevard, Federal Avenue, San Vicente Boulevard, and Montana Avenue to Lincoln Boulevard in the City of Santa Monica. Route 3 then travels along Lincoln Boulevard to Wilshire Boulevard, then through the downtown area of Santa Monica along 4th Street between Wilshire Boulevard to Pico Boulevard, before returning to its route along Lincoln Boulevard to continue through the project study area, including project-serving stops on Lincoln Boulevard at both Bali Way and Mindanao Way (in both directions), to Manchester Avenue in the Westchester community of the City of Los Angeles. From Manchester Avenue, Route 3 then provides service along Sepulveda Boulevard, 96th Street, including a stop at the LAX City Bus Center, along Airport Boulevard, Century Boulevard, and Aviation Boulevard before terminating at the Metro Green Line Station, and returning to UCLA via the reverse route. Route 3 operates in the project vicinity on weekdays from approximately 5:30 AM to 12:30 PM, with headways of approximately 15 minutes in both directions throughout the day. Weekend and holiday service is also provided during approximately the same hours, although headways can range from 15 to 30 minutes, depending on the time of day.

BBB Rapid 3 – This limited-stop bus line provides weekday morning and afternoon/evening service from downtown Santa Monica to the Metro Green Line Station at Imperial Highway and Aviation Boulevard near LAX. The Rapid 3 route loops along Arizona Avenue, 6th Street, and Wilshire Boulevard before travelling on 4th Street to Pico Boulevard, then along Pico Boulevard to Lincoln Boulevard before continuing on Lincoln Boulevard through the project vicinity, providing project-serving stops for both northbound and southbound travel at Maxella Avenue (approximately one-third of a mile walking distance from the site) along the way. South of the project vicinity, Rapid 3 continues along Lincoln Boulevard, 96th Street, including a stop at the LAX City Bus Center, Airport Boulevard, Century Boulevard, and finally Aviation Boulevard to reach the Metro Green Line Station before returning to Santa Monica along the reverse route. Rapid 3 operates in the morning between approximately 5:45 AM and 10:30 AM, and again in the afternoon/evening between approximately 1:30 PM and 9:00 PM, with 15-minute headways in each direction throughout these service periods. Rapid 3 does not provide weekday midday (between 10:30 AM and 1:30 PM), weekend, or holiday service.

As described in the preceding pages, public transportation service is available either directly at or within convenient walking distance of the project site, and as such, it is likely that some of the project's employees and/or patrons could utilize public transit to travel to destinations within the local area, or throughout the larger metropolitan Los Angeles area via transfers to other service providers. However, based on the anticipated operations of the proposed project's uses, and to assure a conservative analysis of the project's potential traffic impacts, no significant transit use was assumed for the project beyond those nominal levels intrinsically included in the LUP or ITE trip generation data used to estimate the project's trips, as described earlier in this report.

## ANALYSIS OF AREA TRAFFIC CONDITIONS

Based on a review of the proposed project's trip generation and site access details described in the previous section, consultation with the Los Angeles County Department of Public Works, Traffic and Lighting Division, determined that the project traffic study should evaluate both existing and forecast future weekday conditions at the following 25 intersections:

1. Venice Boulevard and Lincoln Boulevard
2. Washington Boulevard and Pacific Avenue
3. Washington Boulevard and Via Dolce/Dell Avenue
4. Washington Boulevard and Via Marina/Ocean Avenue
5. Washington Boulevard and Palawan Way
6. Washington Boulevard and Abbot Kinney Boulevard
7. Washington Boulevard and Lincoln Boulevard
8. Washington Boulevard and Glencoe Avenue/Costco Plaza Driveway
9. Admiralty Way and Via Marina
10. Admiralty Way and Palawan Way
11. Lincoln Boulevard and Maxella Avenue/Marina Pointe Drive
12. Maxella Avenue and Glencoe Avenue
13. Lincoln Boulevard and Marina Expressway (SR-90)
14. Admiralty Way and Bali Way
15. Lincoln Boulevard and Bali Way
16. Admiralty Way and Mindanao Way
17. Lincoln Boulevard and Mindanao Way
18. Mindanao Way and Eastbound Marina Expressway (SR-90)
19. Mindanao Way and Westbound Marina Expressway (SR-90)
20. Mindanao Way and Glencoe Avenue
21. Admiralty Way and Fiji Way
22. Lincoln Boulevard and Fiji Way
23. Culver Boulevard and Eastbound Marina Expressway (SR-90) On/Off-Ramps
24. Culver Boulevard and Westbound Marina Expressway (SR-90) Off-Ramp
25. Lincoln Boulevard and Jefferson Boulevard

These 25 study intersections include five locations under the exclusive jurisdiction of the County, (study intersections 9, 10, 14, 16, and 21) 14 intersections under the sole jurisdiction of the City of Los Angeles (1, 2, 6 through 8, 11 through 13, 18 through 20, and 23 through 25), and six additional intersections (3 through 5, 15, 17, and 22) exhibiting shared County/City jurisdiction (typically 25 percent County, 75 percent City), and represent the locations within the study area most likely to be affected by traffic generated by the proposed project.

All of the study intersections are controlled by multi-phase, actuated traffic signals, with the exception of Washington Boulevard and Palawan Way, which is a “tee” intersection, STOP sign controlled along on the Palawan Way approach. Additionally, each of the signalized intersections in the study area, including locations under the jurisdiction of the County, are improved with LADOT’s Automated Traffic Surveillance and Control (“ATSAC”) traffic signal coordination software, as well as the next-generation Adaptive Traffic Control System (“ATSC”) upgrades. These systems enhance the overall capacity of a network of interconnected traffic signals by monitoring the traffic flow from adjacent ATSAC/ATCS intersections and adjusting signal timing and phasing in real time to maximize vehicular throughput and minimize delay.

**Existing (Year 2013) Traffic Volumes**

*Existing (No Project) Conditions*

The weekday peak hour traffic volume data at each of the study intersections were obtained from counts performed for this study in December of 2011. Based on traffic growth trends in the study area, it is expected that the traffic patterns and volumes identified in these counts will remain relatively constant, and continue to accurately reflect traffic conditions in the study area for some time. However, for purposes of this analysis, the December 2011 count data were increased using the County’s recommended “ambient traffic growth factor” (described later in this report) to estimate the traffic volumes for the year 2013 conditions identified in this study. The count data are representative of typical mid-week conditions during weeks with no holidays or other special events, and with all area businesses and schools in full, regular operation. The “peak hour” volumes described in this analysis reflect the highest four consecutive 15-minute periods within a larger three-hour count windows; peak hour traffic volumes were determined individually for each of the study intersections, assuring that the “worst case” operational conditions at each location were analyzed in this study. The “existing” (year 2013) weekday peak hour traffic volumes at each of the 25 study intersections are shown in Figure 9(a) for the AM peak hour conditions and in Figure 9(b) for the PM peak hour conditions.


FIGURE 9(a)

EXISTING (2013) TRAFFIC VOLUMES
AM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.

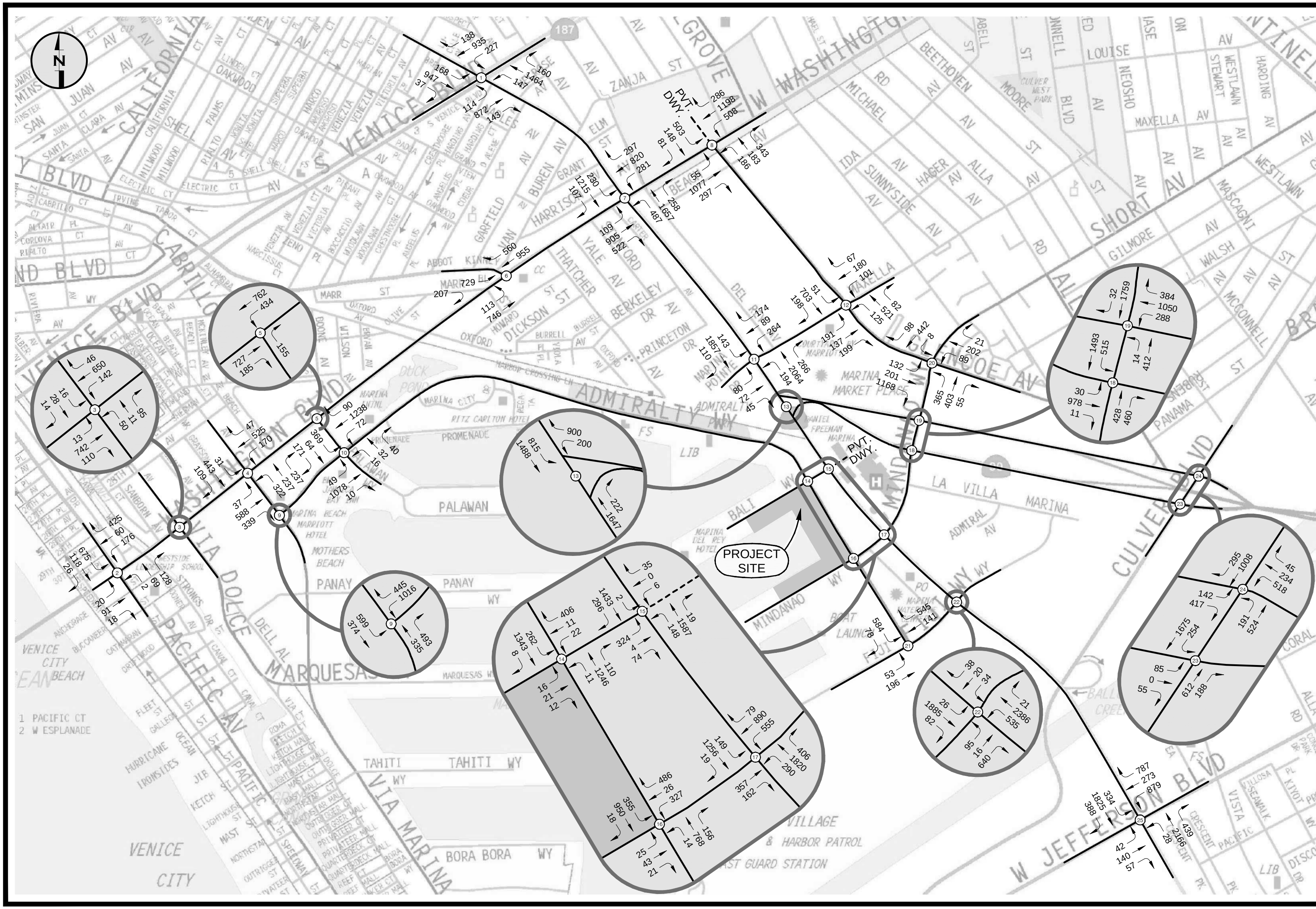


FIGURE 9(b)

EXISTING (2013) TRAFFIC VOLUMES
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

*Existing With Project Conditions*

Although not currently required by the County, recent court decisions regarding the California Environmental Quality Act ("CEQA") have mandated that, in addition to the "future conditions" traffic impact analyses typically requested by jurisdictions in Southern California, all new traffic studies must include an analysis of potential project-related impacts based on the existing conditions in the project vicinity, in order to identify any "immediate" and project-specific traffic impacts within the study area which may result from development of the proposed project alone.

Therefore, in order to comply with this mandate, this study includes an analysis of the effects of project traffic on the current intersection operations at each of the nine study locations. The traffic volumes associated with this scenario were developed by adding the net project traffic volumes shown earlier in Figures 5(a) and 5(b) to the existing ("no project") year 2013 traffic volumes shown in Figures 9(a) and 9(b), and the resulting "Existing (2013) With Project" scenario traffic volumes are shown in Figures 10(a) and 10(b).

**Analysis of Existing (2013) Traffic Conditions**

This study uses the Critical Movement Analysis ("CMA") methodology as the basis for the analysis and evaluation of traffic operations at signalized intersections; the CMA procedures are applicable for the evaluation of signalized intersection operations during the weekday peak hour analysis periods. This analysis technique, detailed in Circular Number 212 published by the Transportation Research Board ("TRB")[3], describes the operating characteristics of an intersection in terms of the "Level of Service", based on intersection traffic volume and other variables such as number and type of signal phasing, lane geometries, and other factors which determine both the quantity of traffic that can move through an intersection ("Capacity") and the quality of that traffic flow ("Level of Service").

"Capacity" represents the maximum total hourly volume of vehicles in the critical lanes which has a reasonable expectation of passing through an intersection under prevailing roadway and traffic conditions. Critical lanes are defined generally as those intersection movement or groups of movements which exhibit the highest "per lane" volumes, thus defining the maximum amount of vehicles attempting to negotiate through the intersection during a specific time period. The capacity of an intersection also varies based on the number of signal phases for the location; more signal phases generally result in more "lost" or "startup" time, as vehicles exhibit slight

[3] Interim Materials on Highway Capacity, Circular Number 212, Transportation Research Board, Washington, D.C., 1980.

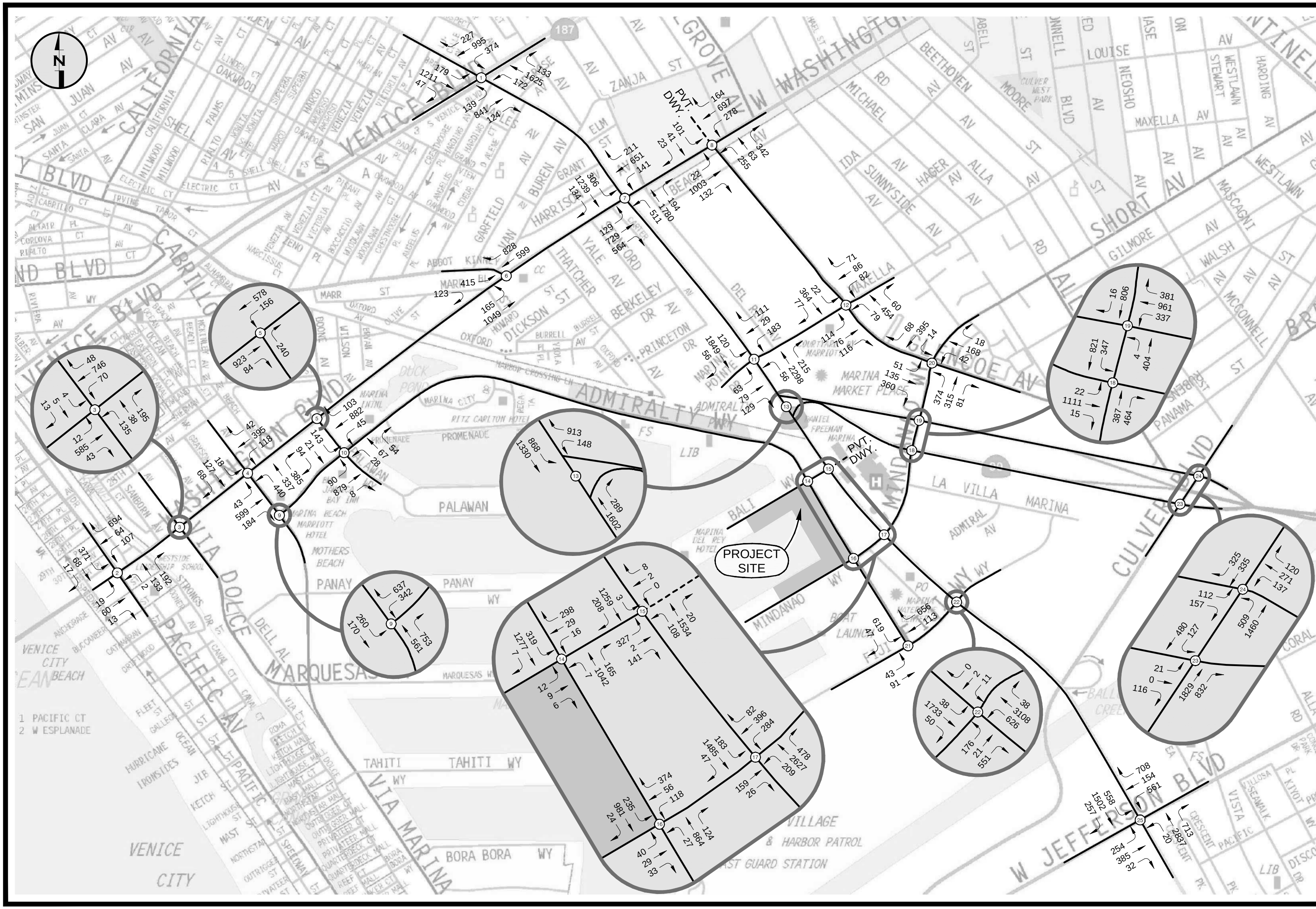


FIGURE 10(a)

EXISTING (2013) TRAFFIC VOLUMES
WITH PROJECT
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

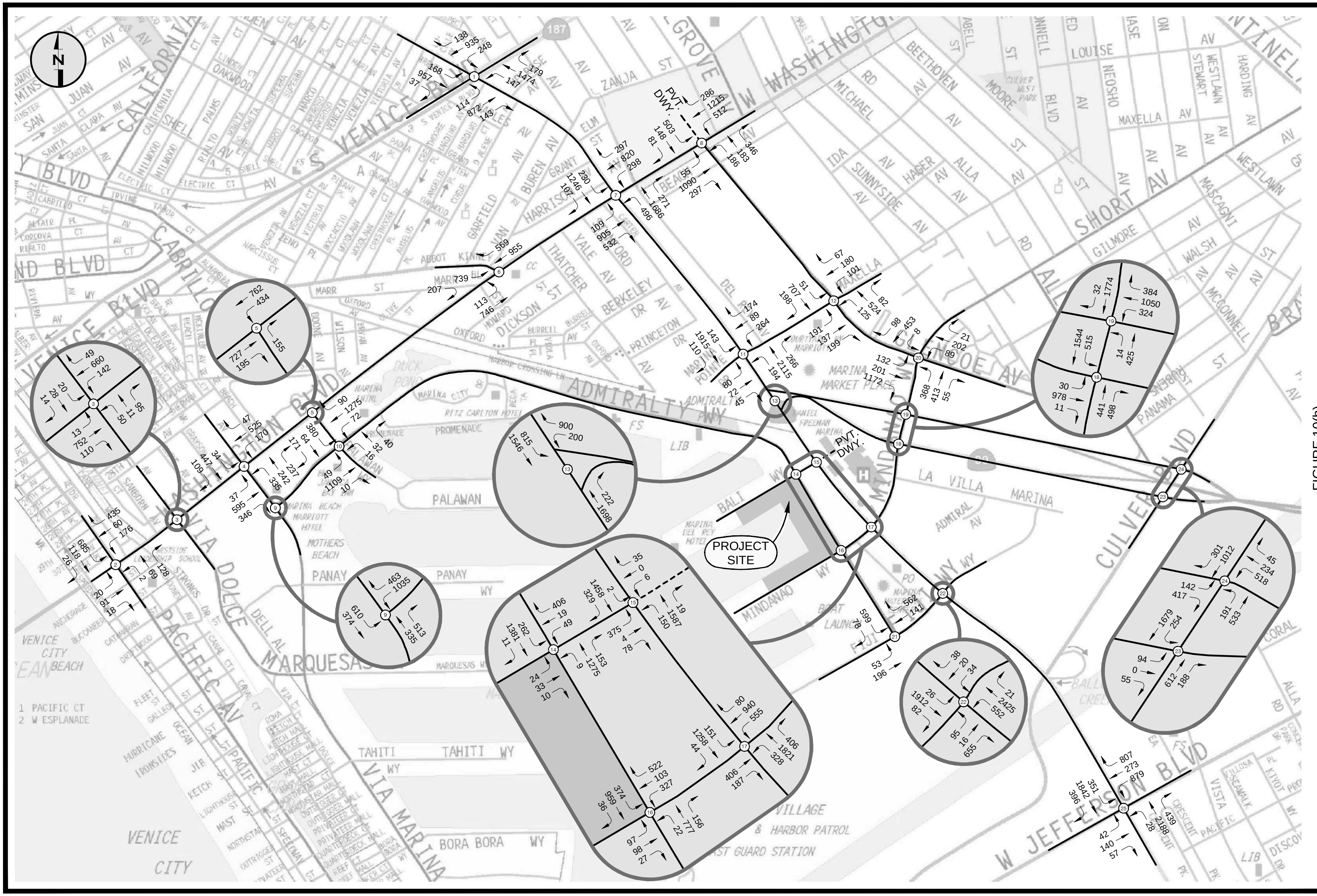


FIGURE 10(b)

EXISTING (2013) TRAFFIC VOLUMES
WITH PROJECT
PM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.

driver reaction delays when signal indications change from “red” to “green”. Additional signal phases introduce more signal indication changes, creating more opportunities for lost time during the signal cycle, and reducing the efficiency, and thus the capacity, of an intersection.

The capacities used in the CMA methodology are assigned to the various intersection operating conditions based on the number of traffic signal phases, as shown in Table 6. For intersection analysis and transportation planning purposes (such as this traffic study), the CMA methodology typically equates the capacity of an intersection to the value of Level of Service (“LOS”) E for the applicable number of signal phases. This value represents the highest volume of traffic that can be adequately accommodated through urban area intersections without a breakdown in operations, resulting in unstable traffic flows, high levels of congestion, and long delays.

**Table 6**
**Critical Movement Analysis Volume Ranges per Level of Service ***

| | **Maximum Sum of Critical Volumes (VPH) vs. Number of Signal Phases** | | |
|---|---|---|---|
| **Level of Service** | **Two Phases** | **Three Phases** | **Four or More Phases** |
| A | 900 | 855 | 825 |
| B | 1,050 | 1,000 | 965 |
| C | 1,200 | 1,140 | 1,100 |
| D | 1,350 | 1,275 | 1,225 |
| E | 1,500 | 1,425 | 1,375 |
| F | - - - - - - - - - - Not Applicable - - - - - - - - - - | | |

* For planning applications only. Not appropriate for operations/design applications.

The “Critical Movement” indices at an intersection are determined by first identifying the sum of all critical movement volumes at that intersection. This value is then divided by the appropriate capacity value for the type of signal control at the study intersection to arrive at the “CMA value” for the intersection, which is roughly equivalent to the volume-to-capacity ratio for the location.

“Level of Service” describes the quality of traffic flow through an intersection. LOS A through LOS C provide good traffic flow characteristics, with little or no congestion or vehicle delay. LOS D is the condition for which most metropolitan area street systems are designed, and represents the highest level of smooth traffic flow. LOS E represents volumes at or near the capacity of the intersection and can result in stoppages of momentary duration and unstable traffic flow at the upper reaches of this condition. LOS F occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration. Note that the LOS definitions do not represent a single operating condition, but rather correspond to a range of CMA values, as shown in Table 7.

**Table 7**
**Level of Service as a Function of CMA Value**

| CMA Value | Level of Service | Intersection Operation/Traffic Flow Characteristics |
|---|---|---|
| $\leq$ 0.600 | A | No congestion; all vehicles clear in a single cycle. |
| > 0.600 $\leq$ 0.700 | B | Minimal congestion; all vehicles still clear in a single cycle. |
| > 0.700 $\leq$ 0.800 | C | No major congestion; most vehicles clear in a single cycle. |
| > 0.800 $\leq$ 0.900 | D | Generally uncongested, but vehicles may wait through more than one cycle; no short duration queues form on critical approaches. |
| >0.900 $\leq$ 1.000 | E | Increased congestion on critical approaches; long duration queues form at higher end of range. |
| > 1.000 | F | Over capacity; forced flow with long periods of congestion; substantial queues form. |

Although designed for use with signalized intersections, the CMA methodology can also be useful in the evaluation of the operations of unsignalized locations. For this analysis, a modified CMA analysis was used to analyze the unsignalized intersection of Washington Boulevard and Palawan Way, assuming a reduction in intersection capacity to 1,200 vehicles per hour to account for the somewhat less efficient traffic flows associated with STOP sign control.

Additionally, as described previously, ATSAC/ATCS traffic signal coordination upgrades have been implemented at all of the signalized intersections in the study area, including those under the jurisdiction of the County along Admiralty Way in the Marina. These systems monitor traffic volumes and demands at a network of intersections, and adjust signal phasing programs and timing in real time to maximize the capacity of the intersections in the system, resulting in an approximate 10 percent increase in intersection capacity when compared to non-ATSAC/ATCS equipped intersections. While it is acknowledged that the Los Angeles County Department of Public Works Traffic and Lighting Division traffic study guidelines[4] do not indicate methodologies for evaluating the effects of traffic signal coordination systems such as ATSAC/ATCS, the

[4] "Traffic Impact Analysis Report Guidelines", Los Angeles County Department of Public Works, January 1, 1997.

improvements in traffic flow and intersection operations due to the ATSAC/ATCS improvements occur nonetheless. Therefore, for purposes of this study, the effectiveness of these signal coordination systems was estimated using methodologies identified in LADOT's current Traffic Study Policies and Procedures guidelines (June 2013). In accordance with LADOT policies, the "baseline" CMA values at each of the signalized study intersections (calculated using the standard assumptions and methodologies noted earlier) have been reduced by 0.100 to account for the operational improvements resulting from the ATSAC/ATCS signal upgrades.

By applying the analysis procedures and assumptions described above, the existing (year 2013) weekday AM and PM peak hour operating conditions (CMA value and corresponding LOS) at each of the 25 study intersections were calculated, as summarized below in Table 8.

**Table 8**
**Critical Movement Analysis Summary**
**Existing (2013) Without and With Project Conditions**

| Int. No. | Intersection | Peak Hour | No Project CMA | No Project LOS | With Project CMA | With Project LOS | With Project Impact |
|---|---|---|---|---|---|---|---|
| 1 | Venice Boulevard | AM | **1.026** | **F** | **1.028** | **F** | 0.002 |
| | and Lincoln Boulevard | PM | **0.944** | **E** | **0.954** | **E** | 0.010 * |
| 2 | Washington Boulevard | AM | 0.534 | A | 0.535 | A | 0.001 |
| | and Pacific Avenue | PM | 0.678 | B | 0.685 | B | 0.007 |
| 3 | Washington Boulevard | AM | 0.260 | A | 0.261 | A | 0.001 |
| | and Via Dolce/Dell Avenue | PM | 0.314 | A | 0.320 | A | 0.006 |
| 4 | Washington Boulevard | AM | 0.564 | A | 0.567 | A | 0.003 |
| | and Via Marina/Ocean Avenue | PM | 0.779 | C | 0.788 | C | 0.009 |
| 5 | Washington Boulevard | AM | 0.715 | C | 0.715 | C | 0.000 |
| | and Palawan Way [1] | PM | 0.794 | C | 0.794 | C | 0.000 |
| 6 | Washington Boulevard | AM | 0.561 | A | 0.562 | A | 0.001 |
| | and Abbot Kinney Boulevard | PM | 0.606 | B | 0.609 | B | 0.003 |
| 7 | Washington Boulevard | AM | 0.819 | D | 0.822 | D | 0.003 |
| | and Lincoln Boulevard | PM | 0.897 | D | **0.914** | **E** | 0.017 * |
| 8 | Washington Boulevard | AM | 0.632 | B | 0.635 | B | 0.003 |
| | and Glencoe Avenue/Costco Plaza Driveway | PM | **1.032** | **F** | **1.039** | **F** | 0.007 |
| 9 | Admiralty Way | AM | 0.407 | A | 0.411 | A | 0.004 |
| | and Via Marina [2] | PM | 0.831 | D | 0.845 | D | 0.014 |
| 10 | Admiralty Way | AM | 0.461 | A | 0.464 | A | 0.003 |
| | and Palawan Way [2] | PM | 0.669 | B | 0.689 | B | 0.020 |

**Table 8 (continued)**
**Critical Movement Analysis Summary**
**Existing (2013) Without and With Project Conditions**

| Int. No. | Intersection | Peak Hour | No Project CMA | No Project LOS | With Project CMA | With Project LOS | With Project Impact |
|---|---|---|---|---|---|---|---|
| 11 | Lincoln Boulevard | AM | 0.651 | B | 0.653 | B | 0.002 |
| | and Maxella Avenue/Marina Pointe Drive | PM | 0.644 | B | 0.656 | B | 0.012 |
| 12 | Maxella Avenue | AM | 0.345 | A | 0.345 | A | 0.000 |
| | and Glencoe Avenue | PM | 0.493 | A | 0.495 | A | 0.002 |
| 13 | Lincoln Boulevard | AM | 0.732 | C | 0.734 | C | 0.002 |
| | and Marina Expressway (SR-90) | PM | 0.729 | C | 0.741 | C | 0.012 |
| 14 | Admiralty Way | AM | 0.596 | A | 0.601 | B | 0.005 |
| | and Bali Way [2] | PM | 0.652 | B | 0.687 | B | 0.035 |
| 15 | Lincoln Boulevard | AM | 0.456 | A | 0.461 | A | 0.005 |
| | and Bali Way/Auto Dealership Driveway | PM | 0.576 | A | 0.611 | B | 0.035 |
| 16 | Admiralty Way | AM | 0.565 | A | 0.556 | A | -0.009 |
| | and Mindanao Way [2] | PM | 0.669 | B | 0.721 | C | 0.052 * |
| 17 | Lincoln Boulevard | AM | 0.847 | D | 0.851 | D | 0.004 |
| | and Mindanao Way | PM | 0.861 | D | 0.891 | D | 0.030 * |
| 18 | Mindanao Way | AM | 0.626 | B | 0.628 | B | 0.002 |
| | and EB Marina Expressway (SR-90) | PM | 0.770 | C | 0.788 | C | 0.018 |
| 19 | Mindanao Way | AM | 0.431 | A | 0.432 | A | 0.001 |
| | and WB Marina Expressway (SR-90) | PM | 0.697 | B | 0.701 | C | 0.004 |
| 20 | Mindanao Way | AM | 0.445 | A | 0.447 | A | 0.002 |
| | and Glencoe Avenue | PM | **1.040** | **F** | **1.047** | **F** | 0.007 |
| 21 | Admiralty Way | AM | 0.231 | A | 0.231 | A | 0.000 |
| | and Fiji Way [2] | PM | 0.243 | A | 0.249 | A | 0.006 |
| 22 | Lincoln Boulevard | AM | 0.824 | D | 0.827 | D | 0.003 |
| | and Fiji Way | PM | 0.693 | B | 0.707 | C | 0.014 |
| 23 | Culver Boulevard | AM | 0.469 | A | 0.469 | A | 0.000 |
| | and Marina Freeway (SR-90) EB On/Off-Ramps | PM | 0.515 | A | 0.523 | A | 0.008 |
| 24 | Culver Boulevard | AM | 0.661 | B | 0.662 | B | 0.001 |
| | and Marina Freeway (SR-90) WB Off-Ramp | PM | 0.795 | C | 0.796 | C | 0.001 |
| 25 | Lincoln Boulevard | AM | **1.046** | **F** | **1.048** | **F** | 0.002 |
| | and Jefferson Boulevard | PM | 0.827 | D | 0.837 | D | 0.010 |

Notes:

[1] Unsignalized intersection; capacity assumed as 1,200 vehicles per hour.

[2] Los Angeles County intersection.

"*" Significant impact per Los Angeles County Department of Public Works *Traffic Impact Analysis Report Guidelines*, January 1, 1997, or LADOT *Traffic Study Policies and Procedures*, June 2013.

As shown in Table 8, each of the five study intersections under the jurisdiction of the County (intersections 9, 10, 14, 16, and 21), are currently operating at LOS A or LOS B during both the AM and PM peak hours, with the exception of Via Marina and Admiralty Way, which exhibits LOS D operations during the PM peak hour. Similarly, most of the remaining 20 study intersections (operated by or under sole or shared jurisdiction of the City of Los Angeles) generally also operate at LOS D or better, although four of the intersections, Lincoln Boulevard and Venice Boulevard, Washington Boulevard and Glencoe Avenue/Costco Plaza Driveway, Mindanao Way and Glencoe Avenue, and Lincoln Boulevard and Jefferson Boulevard, exhibit LOS E or F operations during one or both of the peak hours (indicated by bold text).

Both the County's Department of Public Works and LADOT identify the "target" maximum acceptable intersection operation to be LOS D. As such, as indicated in Table 8, a total of 21 of the 25 study intersections currently exhibit "acceptable" operating conditions during the most critical times of the day, and field observations confirm that the roadways and intersections within the study area typically operate at reasonable levels for urban conditions, with most vehicles clearing the intersections during one or two signal cycles under normal conditions. However, it is acknowledged that several of the key roadways within the study area carry high traffic volumes during the peak commute hours, and that traffic flows on these facilities generally exhibit slow speeds and/or "stop-and-go" conditions during these times. During these periods, failure of any of the intersections due to accidents, higher than typical pedestrian volumes, vehicles blocking traffic at intersections, or other factors can produce operational abnormalities ranging from localized short-term congestion and delay to cascade failures of an entire travel corridor, producing substantial gridlock conditions for extended periods throughout the area.

The incremental project-related impacts at each of the 25 study intersections were determined by comparing the results of the analysis of the existing (year 2013) "no project" conditions to those of the "with project" conditions, to identify any potential project-specific traffic impacts that could occur the under current traffic conditions in the project vicinity. As also shown in Table 8, development of the proposed project and the addition of its associated traffic could result in incremental increases in the CMA values at each of the study intersections to varying degrees, depending upon the intersection's proximity to the project site, its location along the anticipated project traffic travel routes, or the specific geometries and/or operating characteristics of the intersection. However, the incremental traffic (and associated CMA value changes) resulting from the proposed project are not expected to result in reductions to the existing ("no project") operating conditions (LOS) at most of the study locations during either peak hour, although the intersection of Washington Boulevard and Lincoln Boulevard could experience a deterioration from acceptable LOS D to undesirable LOS E operations during the PM peak hour; its current LOS D conditions during the AM peak hour will remain unchanged. Nonetheless, the addition of project-related traffic is not anticipated to result in the change from "acceptable" to "undesirable" operations at any other of the study intersections, although several other locations will also exhibit changes in their existing levels of service during one or both of the peak hours.

As also shown in Table 8, the operations at the intersection of Admiralty Way and Bali Way, adjacent to the northeast corner of the project site, could be reduced from existing LOS A to LOS B conditions during the AM peak hour, while the nearby intersection of Lincoln Boulevard and Bali Way could be reduced from LOS A to LOS B conditions during the PM peak hour, due to the addition of project-related traffic. Similarly, the intersections of Admiralty Way and Mindanao Way, located adjacent to the southeast corner of the project site, Mindanao Way and westbound Marina Expressway, and Admiralty Way and Fiji Way, could each be anticipated to experience potential reductions from their current LOS B operations to LOS C conditions during the PM peak hour. However, despite these potential reductions in levels of service, each of these five study intersections is expected to continue to exhibit acceptable (LOS D or better) conditions during both peak hours following the addition of project-related traffic.

*Impact Significance Criteria*

However, project traffic-related changes to the level of service at an intersection, while useful as an indicator of the potential for noticeable effects on the area transportation network, are not the standard used by either the County Department of Public Works or LADOT to evaluate the potential "significance" of a project's incremental traffic impacts on the area roadway network. Both agencies define the significance of a project's traffic impacts based on a "stepped scale", with intersections exhibiting higher LOS conditions and volume-to-capacity ratios being more sensitive to additional traffic than those operating at better levels of service and with more available surplus capacity. As such, a "significant" traffic impact is identified as an increase in the CMA value, due to project-related traffic, of 0.010 or more when the final ("with project") Level of Service is E or F, a CMA increase of 0.020 or more when the final Level of Service is LOS D, or an increase of 0.040 or more at LOS C. No significant impacts are deemed to occur at LOS A or B, as these operating conditions exhibit sufficient surplus capacities to accommodate traffic increases with little effect on traffic delays. The significance criteria used by both Los Angeles County and LADOT to evaluate intersection impacts is shown in Table 9.

**Table 9**
**Los Angeles County/LADOT**
**Significant Traffic Impact Criteria**

| LOS | Final (With Project) CMA Value | Project-Related Increase in CMA Value |
|---|---|---|
| C | > 0.700 ≤ 0.800 | ≥ 0.040 |
| D | > 0.800 ≤ 0.900 | ≥ 0.020 |
| E or F | > 0.900 | ≥ 0.010 |

Therefore, using the County/City traffic impact "significance" criteria summarized in Table 9, the incremental effects of the anticipated project-specific traffic additions to each of the study intersections were evaluated. As also shown in Table 8, in general, the potential traffic impacts of the proposed Parcel 44 redevelopment project are expected to be relatively nominal, although based on the impact evaluation criteria shown in Table 9, significant project-related traffic impacts could occur at four of the 25 study intersections, all during the PM peak hour, under the "Existing (2013) With Project" scenario. These significantly-impacted locations include one location under the sole jurisdiction of the County, at the site-adjacent intersection of Admiralty Way and Mindanao Way, one intersection exhibiting shared City/County jurisdiction, Lincoln Boulevard and Mindanao Way, and two Los Angeles City-only jurisdiction intersections, Lincoln Boulevard and Venice Boulevard, and Lincoln Boulevard and Washington Boulevard. Measures to address these potential project-related significant traffic impacts are described and analyzed later in the "Mitigation Measures" section of this report.

### Future (Year 2016) Traffic Conditions

Future (year 2016) traffic volumes in the project vicinity, and indeed throughout the region, are anticipated to increase as a result of a number of factors, although two factors contribute most significantly to area traffic growth. The first of these factors is ambient increases in the number of vehicles on the roadway system. Ambient traffic growth can occur for a number of reasons; increasing population (not tied to development), additional vehicles for existing households (as children become driving age, or new multi-vehicle status for current single-vehicle families), economic factors such as new jobs creating new worker trips, and other factors.

The second factor is new traffic resulting from ongoing and continued development. A number of other development projects, both within Marina del Rey and outside the County jurisdiction within the City of Los Angeles, are currently either under construction or planned for construction in the project vicinity in the foreseeable future. These projects range from small “in fill” residential developments to large Master Plan projects incorporating hundreds of residential units and thousands of square feet of commercial office, retail, and community space, and each will likely contribute to future traffic volumes in the study area to some degree.

Therefore, since the proposed project is not expected to be built and occupied until some time in the year 2016, its potential traffic additions, and associated traffic impacts, will occur on a roadway system that is anticipated to exhibit more traffic than identified in the “Existing (2013)” conditions described earlier. As such, the analysis of future traffic conditions within the study area as expanded to include potential traffic increases from both ambient traffic growth and from trips generated by other development projects in the vicinity that have not yet been developed. These “Future (2016) Without Project” scenarios represent the forecast traffic conditions in the study area at the time of the proposed project’s completion, but prior to occupancy, and form the baseline for evaluating the effects of the project’s potential incremental traffic additions.

*Without Project Traffic Forecasts*

Briefly, the methodology for estimating future traffic volumes was as follows: First, as described in a preceding section of this report, the current (year 2013) traffic volumes were determined by traffic counts. These existing volumes were then used to estimate future conditions (year 2016) through the application of an “ambient traffic growth factor”. This growth factor, compounded annually, was applied to all of the turning movement volumes at the study intersections to form the baseline traffic volume conditions for the future study year 2016. Although the annual growth factor is expected to fully represent all potential area traffic increases, for the purposes of conservative analysis, traffic generated from nearby “related projects” was also added to these future baseline traffic volumes, to identify future cumulative traffic conditions in the area.

*Ambient Traffic Growth*

Based on analyses of recent traffic growth in the study area, as documented in the current (2010) Los Angeles County Congestion Management Program (“CMP”), the County’s Department of Public Works Traffic and Lighting Division has determined that an annual traffic growth factor of 0.6 percent is appropriate. In fact, the CMP foresees actual anticipated traffic growth in the “West/Central Los Angeles” area encompassing the study vicinity to be approximately 0.14 percent annually, inclusive of both general ambient growth and traffic from cumulative area development (“related projects”), through the year 2016, and as such, the assumed 0.6 percent annual growth factor is expected to be quite conservative. This “ambient traffic growth factor” is used to account for expected increases in traffic resulting from general ambient traffic growth in the study vicinity due to ongoing regional population growth, or from potential development projects not yet proposed or outside of the study area. The ambient growth factor, compounded annually, was applied to the 2013 traffic volumes to develop estimates of the future traffic volumes for the future year 2016 baseline conditions.

*Related Projects*

In addition to the 0.6 percent annual traffic growth rate used for this study, a listing of specific projects located within the study area, an approximately 2.0-mile radius from the project site, was obtained from various sources, including the Los Angeles County Department of Regional Planning, the County Department of Beaches and Harbors, LADOT, and the City of Culver City Planning Department. Additionally, a field survey of the study area was conducted to identify any ongoing developments not on these lists. However, it should be noted, as discussed previously, that the assumed 0.6 percent annual ambient traffic growth factor is expected to accurately represent all area traffic growth within the study period, and as such, the inclusion of additional traffic due to specific projects in the study area in addition to the assumed ambient background traffic growth may tend to overstate cumulative conditions. Therefore, so as not to inordinately deteriorate future traffic conditions and to more accurately predict future traffic volumes, for purposes of this study, related projects generating fewer than 20 net new peak hour trips, or those located outside the 2.0-mile radius, were generally not included as specific traffic generators, and were assumed to be included within the ambient traffic growth increases. However, in order to fully evaluate the cumulative traffic effects of ongoing or proposed development within Marina del Rey itself, all proposed projects located in the Marina were included in this analysis, regardless of their net traffic generation.

Using these assumptions as guidelines, a review of the related projects information indicated that a total of 30 individual projects near the study site, including 12 projects located within the County-controlled portions of Marina del Rey itself, might produce additional traffic at one or more of the 25 study intersections. Therefore, potential traffic from these ongoing or prospective developments were added to the assumed 0.6 percent annual ambient traffic growth to produce the estimates of cumulative future (2016) traffic volumes. The locations of the 26 specific related projects included in this analysis are shown in Figure 11, and each project is individually listed and described in Table 10.

PARCEL 44 \ RELPROJ-MAP


FIGURE 11

6/29/2012

HIRSCH GREEN

Hirsch/Green Transportation Consulting, Inc.

RELATED PROJECTS LOCATIONS MAP

**Table 10**
**Related Projects Descriptions**

| Map No. | Land Use/Description | Size/Units | Address |
|---|---|---|---|
| 1. | Specialty Retail | 10,000 sq. ft. | 585 Venice Boulevard |
| | *Warehouse* | *10,000 sq. ft.* | |
| 2. | Mixed-Use | | |
| | Hotel | 30 room | 305 Ocean Front Walk |
| | Restaurant (High-turnover) | 2,000 sq. ft. | |
| 3. | Mixed-Use | | 580 Venice Boulevard |
| | Residential | 5 unit | |
| | Retail | 5,700 sq. ft. | |
| 4. | Supermarket | 36,800 sq. ft. | 1600 Lincoln Boulevard |
| 5. | LADPW Maintenance Yard Expansion | n/a | 3233 Thatcher Avenue |
| 6. | Loyola Marymount University [1] (student increase) | 2,540 student | 1 LMU Drive |
| 7. | Retail | 8,000 sq. ft. | 4160 Lincoln Boulevard |
| 8. | Marina del Rey Parcel 9 [2] | | NEC Tahiti Way/Via Marina |
| | Hotel | 288 room | |
| | Public Park | 1 acre | |
| 9. | Marina del Rey Parcels FF and 10R [3] | | E/s Via Marina near Marquesas Way |
| | Apartment | 526 unit | |
| | Boat dock | 168 slip | |
| | *Apartment* | *136 unit* | |
| | *Boat Dock* | *184 slip* | |
| 10. | Marina del Rey Parcels 100, 101 [4] | | SWC Via Marina/Panay Way |
| | Apartment | 544 unit | |
| | *Apartment* | *202 unit* | |
| 11. | Marina del Rey Parcel OT [5] | | E/o Palawan Way between Washington Boulevard and Admiralty Way |
| | Senior Care | 114 unit | |
| | Speciality Retail | 3,000 sq. ft. | |
| 12. | Marina del Rey Parcels 52,GG | | Fiji Way, W/o Admiralty Way |
| | Storage | 375 boat | |
| | *County Office* | *2,000 sq.ft.* | |
| | *Public Parking Lot* | *236 space* | |

**Table 10 (continued)**
**Related Projects Descriptions**

| Map No. | Land Use/Description | Size/Units | Address |
|---|---|---|---|
| 13. | Fisherman's Village (Parcels 55, 56, W) [6] | | Near southern terminius of Fiji Way |
| | Retail | 29,150 sq.ft. | |
| | Resturants and Food Court | 37,100 sq.ft. | |
| | Ferry Terminal and Office | 6,500 sq.ft. | |
| | Hotel | 132 room | |
| | Boat Slips | 26 slip | |
| | *Retail* | *2,580 sq.ft.* | |
| | *Office* | *10,404 sq.ft.* | |
| | *Resturants* | *16,149 sq.ft.* | |
| | *Boat Slips* | *17 slip* | |
| 14. | The Village at Playa Vista [7] | | S/o Jefferson Boulevard and Westlawn Avenue |
| | Office | 175,000 sq.ft. | |
| | Apartment | 2,600 unit | |
| | Retail | 150,000 sq.ft. | |
| | Community Serving Uses | 40,000 sq.ft. | |
| 15. | Playa Vista-Phase 1 | | S/o Jefferson Boulevard and E/o Lincoln Boulevard (assumed 30% completed and occupied) |
| | Office | 1,922,050 sq.ft. | |
| | Condominium | 3,246 unit | |
| | Retail | 25,000 sq.ft. | |
| | Production and Stage Support | 1,129,900 sq.ft. | |
| | Community Service Uses | 65,000 sq.ft. | |
| 16. | Villa Marina [8] | | E/o Lincoln Boulevard Between SR-90 and Maxella Avenue |
| | Condominium | 244 unit | |
| | Shopping Center | 9,000 sq. ft. | |
| | *Shopping Center* | *21,038 sq. ft.* | |
| 17. | Mixed-Use [9] | | 12803 Washington Boulevard |
| | Office | 31,150 sq.ft. | |
| | Retail | 6,260 sq.ft. | |
| 18. | Apartment [10] | 77 unit | 4100 Del Rey Avenue |
| 19. | Office | 7,994 sq. ft. | 309-315 E. Culver Boulevard |
| 20. | Mixed-Use [11] | | 6819 Pacific Avenue |
| | Single-Family Residential | 29 unit | |
| | Retail | 4,000 sq. ft. | |

**Table 10 (continued)**
**Related Projects Descriptions**

| Map No. | Land Use/Description | Size/Units | Address |
|---|---|---|---|
| 21. | Mixed-Use [12] | | 220 Culver Boulevard |
| | Apartments | 63 unit | |
| | Pharmacy/Drugstore | 11,000 sq. ft. | |
| | *Restaurant* | 4,000 sq. ft. | |
| 22. | Mixed-Use [13] | | 138 Culver Boulevard |
| | Apartments | 72 unit | |
| | Retail | 7,000 sq. ft. | |
| | Restaurant | 3,000 sq. ft. | |
| | Supermarket | 6,000 sq. ft. | |
| 23. | Marina del Rey Parcel 95 [14] | | Washington Boulevard between |
| | Retail | 14,922 sq. ft. | Via Dolce and Via Marina |
| | Café/Coffee Shop | 1,797 sq. ft. | |
| | Islands Restaurant | 165 seat | |
| | *Office* | *9,180 sq. ft.* | |
| | *Islands Restaurant* | *5,713 sq. ft.* | |
| | *Furniture Sales/Showroom* | *7,500 sq. ft.* | |
| 24. | Office | 41,000 sq. ft. | 11955 W. Washington Boulevard |
| | Retail | 9,500 sq. ft. | |
| 25. | Apartment | 126 unit | 7280 W. Manchester Avenue |
| 26. | Marina del Rey Parcels 49, 77 | | W/o Admiralty Way between |
| | Retail | 135,000 sq. ft. | Mindanao Way and Fiji Way |
| | Office | 26,000 sq. ft. | |
| 27. | Esprit Phase 2 (Parcel 15) | | E/o Via Marina between Mindanao Way |
| | Apartments | 297 unit | and Marquesas Way |
| | Retail | 8,000 sq. ft. | |
| | *Boat Slips* | *41 slip* | |
| | *Restaurant* | *4,400 sq. ft.* | |
| 28. | Marina del Rey Parcel 21 | | 13953 Panay Way |
| | Health Club | 10,000 sq. ft. | |
| | Retail | 2,916 sq. ft. | |
| | Marine Commercial Offices | 11,432 sq. ft. | |
| | Yacht Club | 92 slip | |
| | *Health Club* | *16,000 sq. ft.* | |
| | *Retail* | *2,916 sq. ft.* | |
| | *Marine Commercial Offices* | *5,432 sq. ft.* | |
| | *Yacht Club* | *64 slip* | |

## Table 10 (continued)
## Related Projects Descriptions

| Map No. | Land Use/Description | Size/Units | Address |
|---|---|---|---|
| 29. | Burton Chace Park Expansion | 6.64 acres | Western terminus of Mindanao Way |
| 30. | Marina del Rey Parcel 30/NR [15] | | SEC Admiralty Way and Palawan Way |
| | Apartment | 292 unit | |
| | Supermarket | 14,700 sq. ft. | |
| | Pharmacy/Drugstore | 11,000 sq. ft. | |
| | Retail | 2,300 slip | |
| | Restaurants | 16,670 sq. ft. | |
| | *Restaurant/Entertainment* | *17,000 sq. ft.* | |

Note:

Uses identified in *italics* are existing uses removed in order to develop proposed project.

Sources:

[1] Traffic Impact Assessment Letter for Proposed Loyola Marymount University Master Plan Project, City of Los Angeles, November 13, 2009.

[2] Traffic Study for Proposed 288-room Hotel and 1.1-Acre Park on Parcel 9U in Marina del Rey, Crain & Associates, March 2006.

[3] Traffic Study for Proposed 526-Unit Residential Development on Parcels FF and 10R in Marina del Rey, Crain & Associates, September 2005.

[4] Traffic Analysis for a Proposed 544-unit Residential Development on Parcels 100 and 101 in Marina del Rey, Crain & Associates, August 2005.

[5] Scoping for Traffic Study for Proposed Congregate Care Facility and Retail on Parcel OT in Marina del Rey, Crain & Associates, May 18, 2006.

[6] Traffic Impact Analysis Report, Proposed Fisherman's Village Enhancement/Expansion Project Near the Southern Terminus of Fiji Way, Marina del Rey, California, Hirsch/Green Transportation Consulting, Inc., September 2007.

[7] Traffic Analysis for The Village at Playa Vista Project, Kaku Associates, and Raju Associates, July 2003.

[8] Memorandum to Eddie Guerro, LADOT, from Pat Gibson and Audrey Naval, May 6, 2009.

[9] Traffic Impact Analysis Report, Proposed 31,150 Square Foot Office and 6,260 Square Foot Retail Development Located at 12803 Washington Boulevard and Culver City, Hirsch/Green Transportation Consulting, Inc., Revised April 2008.

[10] Traffic Impact Analysis Report, Proposed 77-Unit Residential Apartment Development located at 4100 Del Rey Avenue, Los Angeles, Hirsch/Green Transportation Consulting, Inc., April 2011.

[11] Preliminary Trip Generation Calculations, 6819 Pacific Avenue Mixed-Use Project, Hirsch/Green Transportation Consulting, Inc., October 2010.

[12] Preliminary Trip Generation Calculations, 220 Culver Boulevard Mixed-Use Project, Hirsch/Green Transportation Consulting, Inc., October 2010.

[13] Traffic Impact Analysis Report, Proposed 72-Unit Residential and 16,000 Square Foot Commercial Mixed-Use Development Located at 138 Culver Boulevard in Playa del Rey, Hirsch/Green Tranportation Consulting, Inc., Revised March 2011.

[14] Traffic Impact Analysis Report, Proposed Commercial Redevelopment of Parcel 95 on Washington Boulevard between Via Marina and Via Dolce in Marina del Rey, California, Hirsch/Green Transportation Consulting, Inc., November 2011

[15] Preliminary Trip Generation Calculations, Parcel 33/NR Mixed-Use Project, Hirsch/Green Transportation Consulting, Inc., January 2012.

Estimates of the amount of new traffic expected to be generated by these related projects were obtained from Los Angeles County, LADOT, or City of Culver City project records, or where no such information was provided, were determined by applying the appropriate trip generation rates and equations from the ITE *Trip Generation* publication described earlier, or for projects located within Marina del Rey, by using the appropriate trip generation rates identified in the LUP, similar to the calculations described earlier for the proposed Parcel 44 project itself. The resulting related project trip generation estimates are summarized in Table 11.

The related project's traffic volumes shown in Table 11 were then distributed through the study area and assigned to the area roadway and freeway network using assumptions and methodologies similar to those used to assign the trips generated by the proposed project. As with the proposed Parcel 44 project traffic assignments described earlier in this report, the distribution and assignment of related project's traffic was assumed to exhibit the same travel paths during both the AM and PM peak hours. The resulting related project's trip assignments are shown in Figure 12(a) for the AM peak hour and Figure 12(b) for the PM peak hour.

**Ongoing and/or Programmed Future Highway System Improvements**

The existing roadway network serving the study area, consisting of streets and intersections located within both Los Angeles County (Marina del Rey) and the City of Los Angeles, is already improved with a variety of physical (geometric) and/or operational measures designed to enhance traffic flow and reduce travel delays, including the provision of left-turn and/or right-turn channelization at key intersections, prohibition of on-street parking during peak commute traffic periods to provide additional travel lanes, and the installation of LADOT's ATSAC/ATCS traffic signal coordination systems at all of the signalized study intersections (both County and City) in the project vicinity. Additionally, a new northbound right-turn only lane on Lincoln Boulevard at Mindanao Way was recently installed, although this improvement was completed prior to the preparation of this study, and its effects on area travel patterns and traffic flows are already incorporated into the "existing" (year 2013) area traffic conditions analyzed earlier in this report.

As a result, few roadway, intersection, or traffic signal system improvements remain in the project vicinity. However, Chapter C.11 of the current (updated) Marina del Rey LUP includes programmed improvements ("Revised Set of Intersection Improvements") to a number of intersections and roadways located within the County portion of Marina del Rey, particularly along Admiralty Way, which is the key transportation corridor within and through the Marina, and which, as described previously, provides direct access to the proposed project site. The County

**Table 11**
**Related Projects Trip Generation Estimates**

| Map No. | Land Use/Description | Size/Units | | Daily | AM Peak Hour In | AM Peak Hour Out | PM Peak Hour In | PM Peak Hour Out |
|---|---|---|---|---|---|---|---|---|
| 1. | Specialty Retail | 10,000 | sq. ft. | 429 | 6 | 4 | 18 | 19 |
| | *Warehouse* | *10,000* | *sq. ft.* | *36* | *2* | *1* | *1* | *2* |
| | | | | **393** | **4** | **3** | **17** | **17** |
| 2. | Mixed-Use | | | | | | | |
| | Hotel | 30 | room | 245 | 10 | 7 | 11 | 10 |
| | Restaurant (High-turnover) | 2,000 | sq. ft. | 254 | 12 | 11 | 13 | 8 |
| | | | | **499** | **22** | **18** | **24** | **18** |
| 3. | Mixed-Use | | | | | | | |
| | Residential | 5 | unit | 33 | 1 | 2 | 3 | 1 |
| | Retail | 5,700 | sq. ft. | 253 | 5 | 3 | 13 | 16 |
| | | | | **286** | **6** | **5** | **16** | **17** |
| 4. | Supermarket | 36,800 | sq. ft. | 3,762 | 81 | 51 | 165 | 159 |
| 5. | LADPW Maintenance Yard Expansion | n/a | | 75 | 29 | 1 | 1 | 29 |
| 6. | Loyola Marymount University (student increase) | 2,540 | student | 2,540 | 146 | 30 | 112 | 111 |
| 7. | Retail | 8,000 | sq. ft. | 102 | (1) | (1) | 20 | 16 |
| 8. | Marina del Rey Parcel 9 | | | | | | | |
| | Hotel | 288 | room | 1,588 | 63 | 54 | 46 | 56 |
| | Public Park | 1 | acre | ---- | ---- | ---- | ---- | ---- |
| | | | | **1,588** | **63** | **54** | **46** | **56** |
| 9. | Marina del Rey Parcels FF and 10R | | | 1,499 | 24 | 111 | 87 | 39 |
| | Apartment | 526 | unit | | | | | |
| | Boat dock | 168 | slip | | | | | |
| | *Apartment* | *136* | *unit* | | | | | |
| | *Boat Dock* | *184* | *slip* | | | | | |
| 10. | Marina del Rey Parcels 100, 101 | | | | | | | |
| | Apartment | 544 | unit | 2,154 | 34 | 156 | 120 | 57 |
| | *Apartment* | *202* | *unit* | *1,354* | *13* | *57* | *45* | *21* |
| | | | | **800** | **21** | **99** | **75** | **36** |

**Table 11 (continued)**
**Related Projects Trip Generation Estimates**

| Map No. | Land Use/Description | Size/Units | | Daily | AM Peak Hour In | AM Peak Hour Out | PM Peak Hour In | PM Peak Hour Out |
|---|---|---|---|---|---|---|---|---|
| 11. | Marina del Rey Parcel OT | | | 561 | 10 | 37 | 31 | 19 |
| | Senior Care | 114 | unit | | | | | |
| | Speciality Retail | 3,000 | sq. ft. | | | | | |
| 12. | Marina del Rey Parcels 52,GG | | | | | | | |
| | Storage | 375 | boat | 1,081 | 16 | 31 | 18 | 33 |
| | *County Office* | *2,000* | *sq.ft.* | *17* | *2* | *0* | *1* | *2* |
| | *Public Parking Lot* | *236* | *space* | ---- | ---- | ---- | ---- | ---- |
| | | | | **1,064** | **14** | **31** | **17** | **31** |
| 13. | Fisherman's Village (Parcels 55, 56, W) | | | 2,496 | 41 | 58 | 121 | 99 |
| | Retail | 29,150 | sq.ft. | | | | | |
| | Resturants and Food Court | 37,100 | sq.ft. | | | | | |
| | Ferry Terminal and Office | 6,500 | sq.ft. | | | | | |
| | Hotel | 132 | room | | | | | |
| | Boat Slips | 26 | slip | | | | | |
| | *Retail* | *2,580* | *sq.ft.* | | | | | |
| | *Office* | *10,404* | *sq.ft.* | | | | | |
| | *Resturants* | *16,149* | *sq.ft.* | | | | | |
| | *Boat Slips* | *17* | *slip* | | | | | |
| 14. | The Village at Playa Vista | | | 24,220 | 577 | 1,049 | 1275 | 1027 |
| | Office | 175,000 | sq.ft. | | | | | |
| | Apartment | 2,600 | unit | | | | | |
| | Retail | 150,000 | sq.ft. | | | | | |
| | Community Serving Uses | 40,000 | sq.ft. | | | | | |
| 15. | Playa Vista-Phase 1 | | | 40,771 | 3,647 | 1,489 | 2,640 | 3,327 |
| | Office | 1,922,050 | sq.ft. | | | | | |
| | Condominium | 3,246 | unit | | | | | |
| | Retail | 25,000 | sq.ft. | | | | | |
| | Production and Stage Support | 1,129,900 | sq.ft. | | | | | |
| | Community Service Uses | 65,000 | sq.ft. | | | | | |
| 16. | Villa Marina | | | 896 | 11 | 84 | 72 | 11 |
| | Condominium | 244 | unit | | | | | |
| | Shopping Center | 9,000 | sq. ft. | | | | | |
| | *Shopping Center* | *21,038* | *sq. ft.* | | | | | |

**Table 11 (continued)**
**Related Projects Trip Generation Estimates**

| Map No. | Land Use/Description | Size/Units | Daily | AM Peak Hour In | AM Peak Hour Out | PM Peak Hour In | PM Peak Hour Out |
|---|---|---|---|---|---|---|---|
| 17. | Mixed-Use | | 620 | 47 | 9 | 15 | 48 |
| | Office | 31,150 sq.ft. | | | | | |
| | Retail | 6,260 sq.ft. | | | | | |
| 18. | Apartment | 77 unit | 512 | 8 | 31 | 35 | 19 |
| 19. | Office | 7,994 sq. ft. | 88 | 11 | 1 | 4 | 18 |
| 20. | Mixed-Use | | 438 | 7 | 13 | 28 | 26 |
| | Single-Family Residential | 29 unit | | | | | |
| | Retail | 4,000 sq. ft. | | | | | |
| 21. | Mixed-Use | | 446 | 18 | 33 | 31 | 29 |
| | Apartments | 63 unit | | | | | |
| | Pharmacy/Drugstore | 11,000 sq. ft. | | | | | |
| | *Restaurant* | 4,000 sq. ft. | | | | | |
| 22. | Mixed-Use | | 1,204 | 28 | 48 | 82 | 63 |
| | Apartments | 72 unit | | | | | |
| | Retail | 7,000 sq. ft. | | | | | |
| | Restaurant | 3,000 sq. ft. | | | | | |
| | Supermarket | 6,000 sq. ft. | | | | | |
| 23. | Marina del Rey Parcel 95 | | 220 | (1) | 6 | 13 | 4 |
| | Retail | 14,922 sq. ft. | | | | | |
| | Café/Coffee Shop | 1,797 sq. ft. | | | | | |
| | Islands Restaurant | 165 seat | | | | | |
| | *Office* | *9,180 sq. ft.* | | | | | |
| | *Islands Restaurant* | *5,713 sq. ft.* | | | | | |
| | *Furniture Sales/Showroom* | *7,500 sq. ft.* | | | | | |
| 24. | Office | 41,000 sq. ft. | 451 | 56 | 8 | 10 | 51 |
| | Retail | 9,500 sq. ft. | 421 | 8 | 5 | 11 | 15 |
| | | | **872** | **64** | **13** | **21** | **66** |
| 25. | Apartment | 126 unit | (156) | (6) | 42 | 14 | (46) |

**Table 11 (continued)**
**Related Projects Trip Generation Estimates**

| Map No. | Land Use/Description | Size/Units | Daily | AM Peak Hour In | AM Peak Hour Out | PM Peak Hour In | PM Peak Hour Out |
|---|---|---|---|---|---|---|---|
| 26. | Marina del Rey Parcels 49, 77 | | | | | | |
| | Retail | 135,000 sq. ft. | 5,797 | 82 | 53 | 294 | 305 |
| | Office | 26,000 sq. ft. | 286 | 35 | 5 | 10 | 47 |
| | | | **6,083** | **117** | **58** | **304** | **352** |
| 27. | Esprit Phase 2 (Parcel 15) | | | | | | |
| | Apartments | 297 unit | 1,975 | 30 | 121 | 63 | 34 |
| | Retail | 8,000 sq. ft. | 355 | 7 | 4 | 16 | 20 |
| | *Boat Slips* | *41 slip* | *118* | *2* | *3* | *2* | *4* |
| | *Restaurant* | *4,400 sq. ft.* | *559* | *27* | *24* | *28* | *18* |
| | | | **1,653** | **8** | **98** | **49** | **32** |
| 28. | Marina del Rey Parcel 21 | | | | | | |
| | Health Club | 10,000 sq. ft. | 329 | 6 | 8 | 19 | 17 |
| | Retail | 2,915 sq. ft. | 129 | 2 | 2 | 6 | 7 |
| | Marine Commercial Offices | 11,432 sq. ft. | 126 | 16 | 2 | 4 | 21 |
| | Yacht Club | 92 slip | 265 | 4 | 8 | 5 | 8 |
| | *Health Club* | *16,000 sq. ft.* | *527* | *10* | *12* | *31* | *27* |
| | *Retail* | *2,915 sq. ft.* | *129* | *2* | *2* | *6* | *7* |
| | *Marine Commercial Offices* | *5,432 sq. ft.* | *60* | *7* | *1* | *2* | *10* |
| | *Yacht Club* | *64 slip* | *185* | *3* | *5* | *3* | *6* |
| | | | **(52)** | **6** | **0** | **(8)** | **3** |
| 29. | Burton Chace Park Expansion | 6.64 acres | 15 | 2 | 1 | 1 | 3 |
| 30. | Marina del Rey Parcel 33/NR | | 3,899 | 99 | 172 | 165 | 135 |
| | Apartment | 292 unit | | | | | |
| | Supermarket | 14,700 sq. ft. | | | | | |
| | Pharmacy/Drugstore | 11,000 sq. ft. | | | | | |
| | Retail | 2,300 sq. ft. | | | | | |
| | Restaurants | 16,670 sq. ft. | | | | | |
| | *Restaurant/Entertainment* | *17,000 sq. ft.* | | | | | |

Note:
Uses identified in *italics* are existing uses removed in order to develop proposed project.

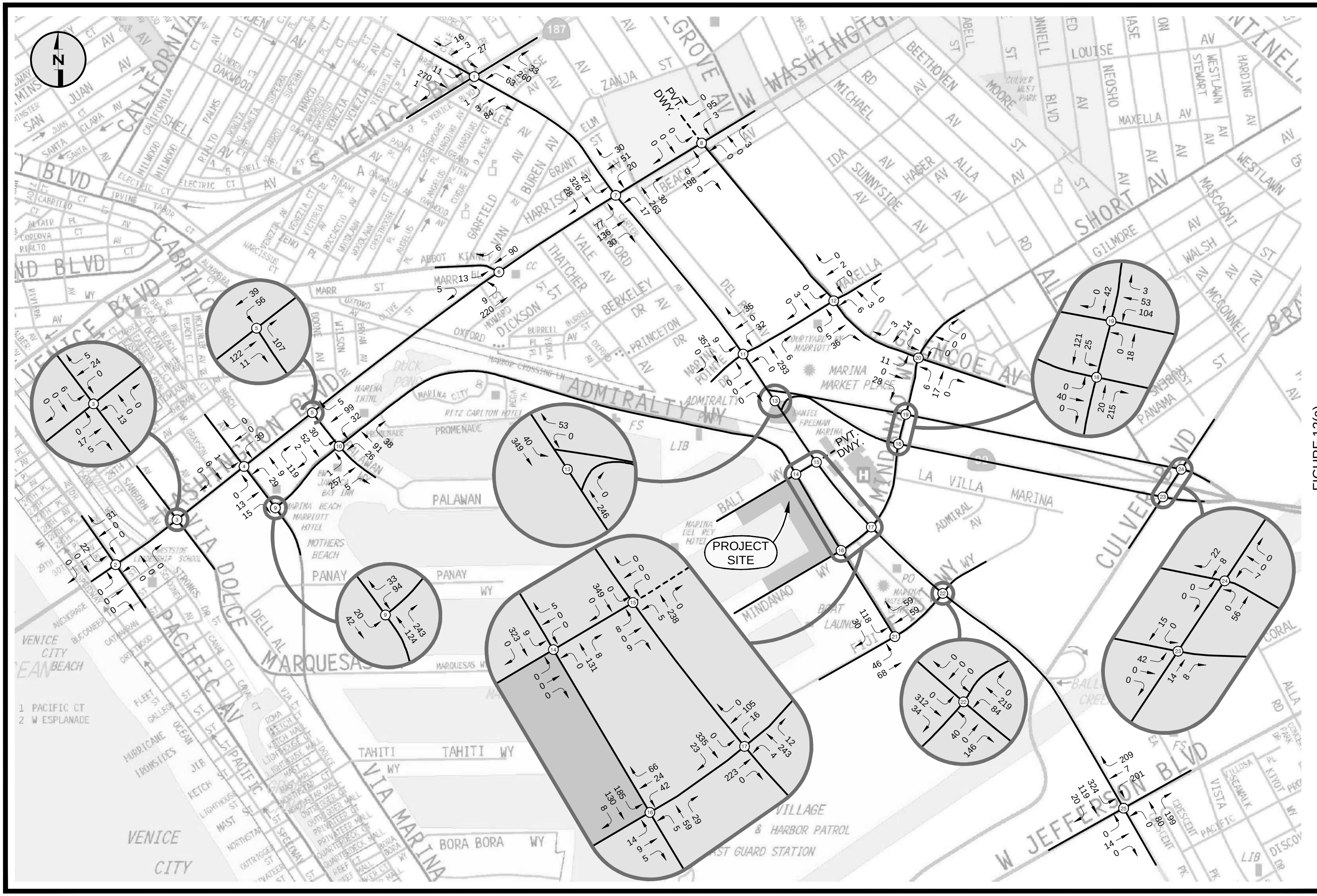


FIGURE 12(a)

RELATED PROJECTS TRAFFIC VOLUMES
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

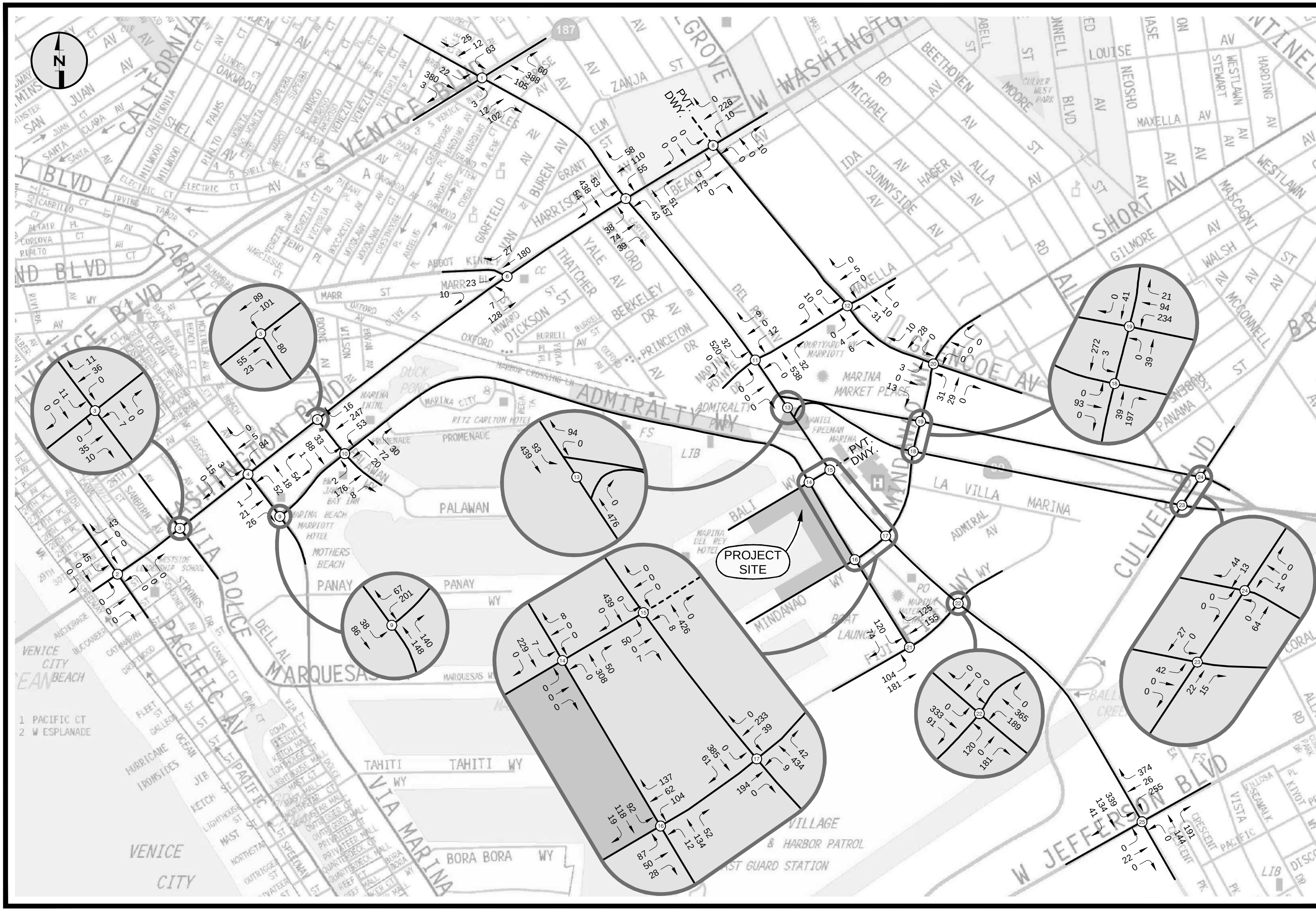


FIGURE 12(b)

RELATED PROJECTS TRAFFIC VOLUMES
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

began construction on several of these roadway improvements in July of this year, and anticipates completion of these measures by the end of the first quarter of 2014. Therefore, these ongoing improvements, which are described in detail below, are expected to be installed well before the year 2016 completion date of the proposed Parcel 44 redevelopment project, and as such, each of the improvements was included as the baseline (pre-project) condition at the effected intersections for the forecast "future" (year 2016) analysis scenarios (the County's "Existing Plus Ambient Growth Only" scenario, and LADOT's "Without Project" conditions).

- Admiralty Way and Palawan Way – The County is currently constructing improvements to restripe the northbound approach of Palawan Way to convert the existing left-turn lane to a shared left-turn/through lane (the existing shared through/right-turn lane would remain), as well as to install a new right-turn only lane on the westbound approach of Admiralty Way, resulting in a future lane configuration of one left-turn lane, two through lanes, and right-turn only lane, although the eastbound approach would continue to exhibit its current configuration of one left-turn lane, one through lane, and one shared through/right-turn lane. Due to the proposed "shared through/left-turn lane" configuration on the northbound Palawan Way approach, this improvement is assumed to also require modification of the existing traffic signal to provide north/south "split" phasing operation.

- Admiralty Way and Bali Way – This intersection is currently being improved to add a second southbound left-turn lane on Admiralty Way at Bali Way, resulting in a final lane configuration for this approach of two left-turn lanes, one through lane, and one shared through/right-turn lane. The remaining approaches to this intersection would remain unchanged from their current configurations. This improvement can be implemented without the need for any roadway widenings along Admiralty Way.

- Admiralty Way and Mindanao Way – The roadway improvements currently being constructed at this location will install a second southbound left-turn lane on Admiralty Way at Mindanao Way (in addition to the existing one left-turn lane, one through lane, and one shared through/right-turn lane), although all other approaches at this intersection will remain unchanged. The signal phasing at this intersection will continue to exhibit the current east-west "split" phase operations.

The County has also recently approved an improvement to the currently STOP-sign controlled intersection at Washington Boulevard and Palawan Way to install a new traffic signal and to reconfigure the northbound approach of Palawan Way to provide dual left-turn lanes in addition to the existing right-turn only lane. The reconfiguration of the northbound approach of this intersection and the installation of a new traffic signal, which is not included in the updated Marina del Rey LUP “Revised Intersection Improvements” list, is designed to address increasing “pass-through” traffic in the area due primarily to developments located outside the Marina, and to relieve growing congestion at the nearby intersections of Via Marina and Admiralty Way, and Washington Boulevard and Via Marina/Ocean Avenue. The planned improvement will provide an alternative outlet for vehicles traveling westbound through the Marina with destinations to the north and west (in Venice and City of Santa Monica), and is expected to reduce the amount of traffic currently making the northbound left turn from Via Marina to Washington Boulevard, and improve the operations at this and other nearby intersections. However, although approved, there is no definitive timeline for installation of this measure; since the improvement cannot be guaranteed by the future (2016) study year, its effects are not incorporated into this analysis.

No other significant roadway or traffic signal improvements within the study area were identified in either the City of Los Angeles Capital Improvements Program (“CIP”) or Los Angeles County Department of Public Works records for implementation by the anticipated 2016 completion date of the proposed project. Further, although it is possible that some or all of the related projects identified earlier will be required to implement localized roadway improvements to mitigate any specific traffic impacts associated with those projects, installation of any such measures cannot be known or guaranteed at this time, and as such, no related projects “mitigation” improvements are assumed in this analysis. Therefore, the analysis of the future year 2016 conditions assumed that the future roadway network geometries and intersection capacities would remain generally unchanged from the current conditions assumed in the analysis of “Existing (2013)” conditions, with the exception of those specific LUP-related improvements noted earlier.

**Analysis of Future (2016) Traffic Conditions**

Using the assumptions and information described in the preceding pages, the future study year (2016) traffic volumes at each of the 25 study intersections were estimated. However, as noted earlier in this report, the study intersections are located within two different jurisdictions, each of which evaluates future conditions, and project-related traffic impacts, in a slightly different manner. Although the proposed project itself is located within the County of Los Angeles, only five of the 25 study intersections (no. 9, 10, 14, 16, and 21) are under the exclusive jurisdiction of the County, with the remainder shared with (no. 3, 4, 5, 15, 17, and 22) or located entirely within and/or operated and maintained by the City of Los Angeles, including intersections adjacent to the Marina along both Washington Boulevard and Lincoln Boulevard.

The County Department of Public Works utilizes a two-step process in the evaluation of future conditions and the assessment of potential project impacts. First, project-specific impacts on the future conditions are identified by using only the anticipated ambient growth traffic increases in the existing traffic ("With Ambient Growth Only" scenario) as the baseline, and then adding the project-specific traffic to this scenario (producing the "With Ambient Growth Plus Project" conditions) in order to identify the incremental effects of the project itself. This methodology separates potential project-specific traffic impacts from those that may be associated with cumulative development (related projects) in the study area, and allows for the identification of any traffic impacts which could result from development of the proposed project alone. Mitigation of these project-specific impacts is considered to be the responsibility of the individual project alone, through installation of acceptable roadway and/or traffic signal improvements or other measures directly, or through contribution to funding mechanisms designed to improve locations significantly impacted by the project.

Next, the cumulative traffic generated by the 30 identified related projects in the study area is added to the "With Ambient Growth Plus Project" traffic volume forecasts, to create the final "With Cumulative Development" traffic scenario, which includes all anticipated traffic increases within the study area, including those of the proposed project. These forecast conditions are then again compared to the earlier "With Ambient Growth Only" scenario to determine the potential cumulative impacts of all expected traffic increases in the study area for the future study year. This step allows for the identification of potential long-term roadway improvements that may be necessary to mitigate total anticipated traffic growth in the study area, but which are beyond the ability of any particular development to implement.

To address the combined effects of both project-specific and cumulative development traffic impacts, the County has identified a series of improvements for roadways and/or intersections located in and around the Marina. These improvements are funded wholly or in part by the Marina del Rey traffic impact mitigation fees, originally identified in the LUP's now-superseded Transportation Improvement Program ("TIP") and also incorporated into the recent LUP updates. As part of the evaluation of potential project traffic impacts on the intersections under the jurisdiction of the County within Marina del Rey, the project's "fair share" contributions to any such cumulative improvements are also identified, as a percentage of the total incremental cumulative impacts. This analysis methodology was used to identify future conditions, including both project-specific and cumulative (project plus related projects) impacts, only for those study intersections identified earlier as within Marina del Rey and under the County's jurisdiction.

The City of Los Angeles (LADOT) does not specifically evaluate or identify the potential impacts of cumulative development on the area intersections, but rather combines the effects of both the forecast ambient traffic growth and traffic generated by related projects to estimate the future "Without Project" conditions. The project-related incremental traffic volumes are then added to this no-project baseline to form the City's "With Project" traffic forecasts, against which the incremental impacts of the proposed project are identified and evaluated. Like the County, LADOT also requires individual projects to mitigate any identified project-specific impacts. While the LADOT impact analysis methodology does not specifically identify either cumulative impacts or cumulative mitigation requirements at intersections under its jurisdiction, it is of note that the forecast LADOT "With Project" conditions are identical to those produced under the County's "With Cumulative Development" traffic forecast scenario.

Further, the inclusion of traffic generated by the related projects in the pre-project future year baseline traffic conditions produces higher "Without Project" intersection LOS values against which the project's incremental traffic additions are compared, increasing the potential for project-specific impacts as compared to the County's evaluation methodology. As described later in this report, both LADOT and the County Department of Public Works utilize the same significance criteria to evaluate project traffic impacts at study intersections. However, these criteria exhibit smaller thresholds for significance as intersection LOS increases, with higher baseline ("Without Project") conditions resulting in smaller project traffic increments being identified as "significant", and potentially resulting in project-specific impacts (and therefore requiring associated mitigation improvements) that would otherwise not be identified under the County's analysis methodology. In general, however, both analysis methodologies produce approximately equivalent results regarding the determination of project traffic impacts.

The future (year 2016) traffic volumes for the intersection conditions analyses described above were developed by combining the appropriate ambient traffic growth forecasts, related projects traffic estimates, and net project-specific traffic additions as noted for each analysis scenario. The County's "Ambient Growth Only" conditions are shown in Figures 13(a) and 13(b) for the AM and PM peak hour, respectively, while the "With Ambient Growth Plus Project" conditions are shown in Figure 14(a) for the AM peak hour, and in Figure 14(b) for the PM peak hour. Similarly, the LADOT "Without Project" traffic volumes are shown for the AM and PM peak hours in Figures 15(a) and 15(b), respectively. Finally, LADOT's "With Project" traffic volume scenario (which is the same as the County's "With Cumulative Development" conditions) is shown in Figure 16(a) for the AM peak hour and in Figure 16(b) for the PM peak hour.


FIGURE 13(a)

FUTURE (2016) TRAFFIC VOLUMES
WITH AMBIENT GROWTH ONLY (LACO ONLY)
AM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.

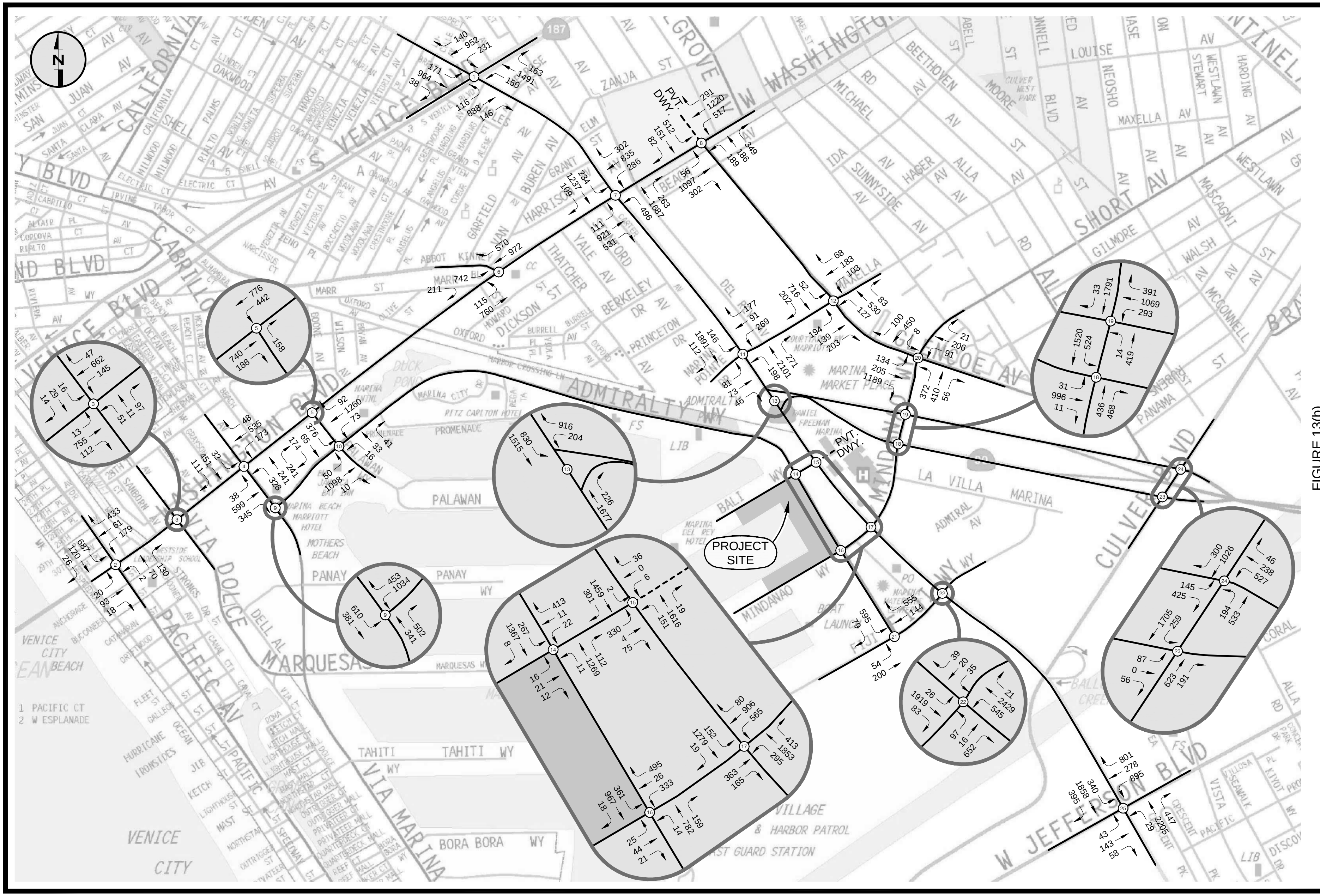


FIGURE 13(b)

FUTURE (2016) TRAFFIC VOLUMES
WITH AMBIENT GROWTH ONLY (LACO ONLY)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.


FIGURE 14(a)

FUTURE (2016) TRAFFIC VOLUMES
WITH AMBIENT GROWTH PLUS PROJECT (LACO ONLY)
AM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.


FIGURE 14(b)

FUTURE (2016) TRAFFIC VOLUMES
WITH AMBIENT GROWTH PLUS PROJECT (LACO ONLY)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

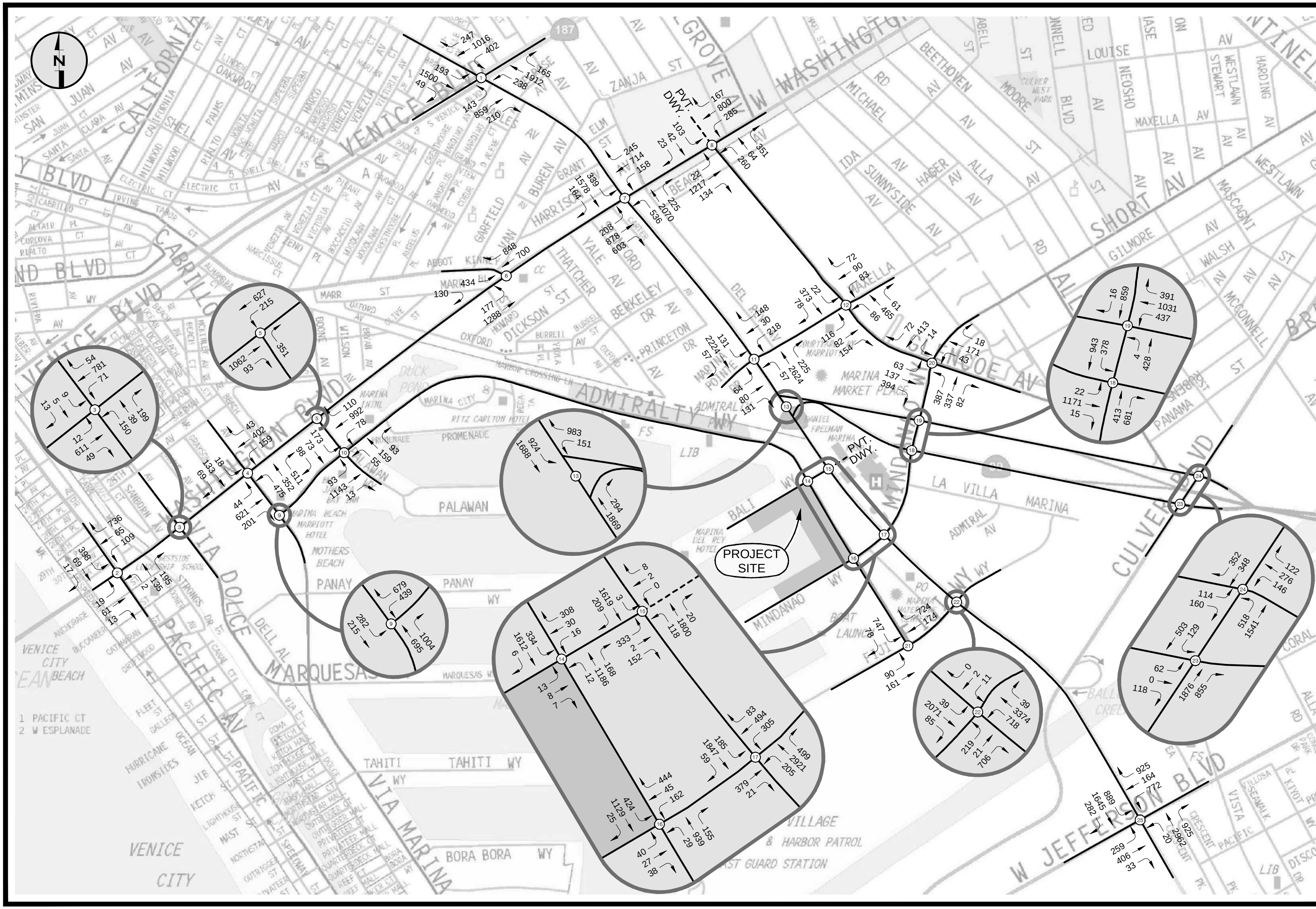


FIGURE 15(a)

FUTURE (2016) TRAFFIC VOLUMES
WITHOUT PROJECT
(INCLUDES AMBIENT GROWTH PLUS CUMULATIVE DEVELOPMENT - LADOT ONLY)
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.


FIGURE 15(b)

FUTURE (2016) TRAFFIC VOLUMES
WITHOUT PROJECT
(INCLUDES AMBIENT GROWTH PLUS CUMULATIVE DEVELOPMENT - LADOT ONLY)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.


FIGURE 16(a)
FUTURE (2016) TRAFFIC VOLUMES
WITH PROJECT
(INCLUDES CUMULATIVE DEVELOPMENT)
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

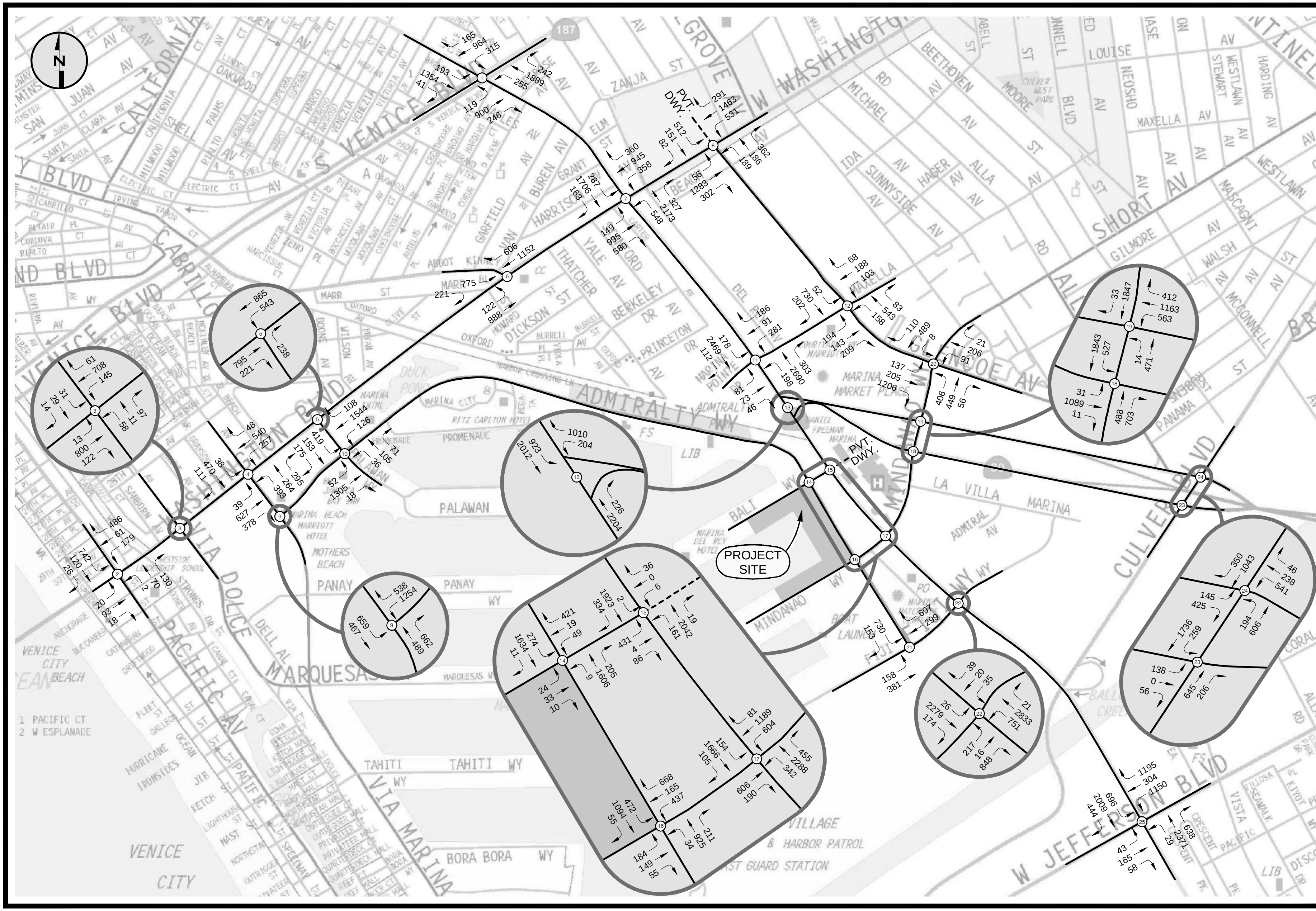


FIGURE 16(b)

FUTURE (2016) TRAFFIC VOLUMES
WITH PROJECT
(INCLUDES CUMULATIVE DEVELOPMENT)
PM PEAK HOUR

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The traffic volumes shown in Figures 13 through 16 were then analyzed using the same CMA methodologies and procedures described earlier in the evaluation of the year 2013 “Existing” conditions, in order to identify the forecast future traffic conditions in the study area both with and without development of the proposed Parcel 44 project. Note that Figures 13 through 16 identify the forecast future traffic volumes at each of the 25 study intersections for each of the various traffic scenarios described above, regardless of whether they are under the exclusive jurisdiction of the County or the City of Los Angeles, or exhibit shared jurisdiction.

However, for purposes of this study, only those analysis scenarios and/or intersections appropriate to either the County’s analysis methodology or LADOT’s analysis methodology were included in the analyses for each of the two jurisdictions. As such, the intersections under the exclusive jurisdiction of the County (intersections 9, 10, 14, 16, and 21) were not evaluated for the LADOT analysis scenarios, nor were those intersections under the exclusive jurisdiction of the City of Los Angeles evaluated for the County’s analysis scenarios, although it should be noted that the intersections exhibiting shared City/County jurisdiction were also evaluated using the LADOT scenarios, since these locations typically exhibit only one approach (or 25 percent of the intersection) within the County’s jurisdiction. The results of the analysis of future conditions, including both the County and LADOT methodologies, are summarized in Table 12.

*Project-Specific Impact Analysis - Los Angeles County Intersections*

This evaluation is appropriate only for the five intersections under the County’s jurisdiction; Admiralty Way and Via Marina, Admiralty Way and Palawan Way, Admiralty Way and Bali Way, Admiralty Way and Mindanao Way, and Admiralty Way and Fiji Way. The future benchmark “With Ambient Growth Only” traffic volumes for this scenario, shown in Figures 13(a) and 13(b), include only the expected ambient traffic growth (0.6 percent annually) at these intersections, which reflect the County’s methodology for forecasting the future (year 2016) “without project” conditions, to which the net peak hour traffic generated by the proposed project were added to determine the potential near-term incremental effects of the project at each study intersection.

As shown in Table 12 for the “With Ambient Growth Only” conditions, operational levels of service at the subject intersections are not anticipated to change substantially from the existing 2013 conditions as a result of the anticipated ambient traffic growth, with each of the five County jurisdiction intersections expected to continue to exhibit LOS C or better conditions during both the AM and PM peak hours, including the intersection of Admiralty Way and Via Marina, which will continue to exhibit acceptable LOS D operations during the PM peak hour.

**Table 12**
**Critical Movement Analysis Summary**
**Future (2016) Without and With Project Conditions**

| Int. No. | Intersection | Peak Hour | County Only Methodology: Existing Plus Ambient CMA | Existing Plus Ambient LOS | County Only Methodology: Existing Plus Ambient Plus Project CMA | Existing Plus Ambient Plus Project LOS | Existing Plus Ambient Plus Project Impact | LADOT Only Methodology Without Project CMA | LADOT Only Methodology Without Project LOS | County/LADOT Methodology With Project (Includes Cumulative) CMA | LOS | Project Impact | Cumulative Impact | Project Percent of Total Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Venice Boulevard | AM | n/a | – | n/a | – | n/a | **1.159** | **F** | **1.161** | **F** | 0.002 | n/a | n/a |
| | and Lincoln Blvd. | PM | n/a | – | n/a | – | n/a | **1.139** | **F** | **1.150** | **F** | 0.011 * | n/a | n/a |
| 2 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | 0.567 | A | 0.568 | A | 0.001 | n/a | n/a |
| | and Pacific Ave. | PM | n/a | – | n/a | – | n/a | 0.722 | C | 0.729 | C | 0.007 | n/a | n/a |
| 3 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | 0.286 | A | 0.288 | A | 0.002 | n/a | n/a |
| | and Via Dolce/Dell Ave. | PM | n/a | – | n/a | – | n/a | 0.345 | A | 0.351 | A | 0.006 | n/a | n/a |
| 4 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | 0.674 | B | 0.677 | C | 0.003 | n/a | n/a |
| | and Via Marina/Ocean Ave. | PM | n/a | – | n/a | – | n/a | 0.885 | D | 0.894 | D | 0.009 | n/a | n/a |
| 5 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | **0.914** | **E** | **0.914** | **E** | 0.000 | n/a | n/a |
| | and Palawan Wy. [1] | PM | n/a | – | n/a | – | n/a | **0.983** | **E** | **0.983** | **E** | 0.000 | n/a | n/a |
| 6 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | 0.583 | A | 0.584 | A | 0.001 | n/a | n/a |
| | and Abbot Kinney Blvd. | PM | n/a | – | n/a | – | n/a | 0.694 | B | 0.697 | B | 0.003 | n/a | n/a |
| 7 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | **0.974** | **E** | **0.978** | **E** | 0.004 | n/a | n/a |
| | and Lincoln Blvd. | PM | n/a | – | n/a | – | n/a | **1.109** | **F** | **1.126** | **F** | 0.017 * | n/a | n/a |
| 8 | Washington Blvd. | AM | n/a | – | n/a | – | n/a | 0.720 | C | 0.722 | C | 0.002 | n/a | n/a |
| | and Glencoe Ave. | PM | n/a | – | n/a | – | n/a | **1.123** | **F** | **1.131** | **F** | 0.008 | n/a | n/a |
| 9 | Admiralty Wy. | AM | 0.418 | A | 0.421 | A | 0.003 | n/a | – | 0.515 | A | n/a | 0.097 | 3.1% |
| | and Via Marina [2] | PM | 0.847 | D | 0.861 | D | 0.014 | n/a | – | **1.018** | **F** | n/a | 0.171 * | 8.2% |
| 10 | Admiralty Wy. | AM | 0.431 | A | 0.435 | A | 0.004 | n/a | – | 0.595 | B | n/a | 0.164 | 2.4% |
| | and Palawan Wy. [2] | PM | 0.673 | B | 0.692 | B | 0.019 | n/a | – | 0.847 | D | n/a | 0.174 * | 10.9% |

## Table 12 (continued)
## Critical Movement Analysis Summary
## Future (2016) Without and With Project Conditions

| | | | County Only Methodology | | | | | LADOT Only Methodology | | County/LADOT Methodology | | | | Project Percent of Total Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Existing Plus Ambient | | Existing Plus Ambient Plus Project | | | Without Project | | With Project (Includes Cumulative) | | | | |
| Int. No. | Intersection | Peak Hour | CMA | LOS | CMA | LOS | Impact | CMA | LOS | CMA | LOS | Project Impact | Cumulative Impact | |
| 11 | Lincoln Blvd. | AM | n/a | – | n/a | – | n/a | 0.752 | C | 0.753 | C | 0.001 | n/a | n/a |
| | and Maxella Ave. | PM | n/a | – | n/a | – | n/a | 0.805 | D | 0.818 | D | 0.013 | n/a | n/a |
| 12 | Maxella Ave. | AM | n/a | – | n/a | – | n/a | 0.356 | A | 0.356 | A | 0.000 | n/a | n/a |
| | and Glencoe Ave. | PM | n/a | – | n/a | – | n/a | 0.529 | A | 0.531 | A | 0.002 | n/a | n/a |
| 13 | Lincoln Blvd. | AM | n/a | – | n/a | – | n/a | 0.821 | D | 0.823 | D | 0.002 | n/a | n/a |
| | and Marina Expwy. | PM | n/a | – | n/a | – | n/a | 0.892 | D | **0.904** | **E** | 0.012 * | n/a | n/a |
| 14 | Admiralty Wy. | AM | 0.538 | B | 0.541 | B | 0.003 | n/a | – | 0.596 | B | n/a | 0.058 | 5.2% |
| | and Bali Wy. [2] | PM | 0.621 | B | 0.656 | B | 0.035 | n/a | – | 0.791 | C | n/a | 0.170 * | 20.6% |
| 15 | Lincoln Blvd. | AM | n/a | – | n/a | – | n/a | 0.558 | A | 0.563 | A | 0.005 | n/a | n/a |
| | and Bali Wy. | PM | n/a | – | n/a | – | n/a | 0.719 | C | 0.753 | C | 0.034 | n/a | n/a |
| 16 | Admiralty Wy. | AM | 0.578 | A | 0.568 | A | -0.010 | n/a | – | 0.655 | B | n/a | 0.077 | -13.0% |
| | and Mindanao Wy. [2] | PM | 0.649 | B | 0.685 | C | 0.036 | n/a | – | 0.893 | D | n/a | 0.244 * | 14.8% |
| 17 | Lincoln Blvd. | AM | n/a | – | n/a | – | n/a | **1.011** | **F** | **1.015** | **F** | 0.004 | n/a | n/a |
| | and Mindanao Wy. | PM | n/a | – | n/a | – | n/a | **1.069** | **F** | **1.109** | **F** | 0.040 * | n/a | n/a |
| 18 | Mindanao Wy. | AM | n/a | – | n/a | – | n/a | 0.718 | C | 0.720 | C | 0.002 | n/a | n/a |
| | and EB Marina Expwy. | PM | n/a | – | n/a | – | n/a | **0.915** | **E** | **0.933** | **E** | 0.018 * | n/a | n/a |
| 19 | Mindanao Wy. | AM | n/a | – | n/a | – | n/a | 0.470 | A | 0.471 | A | 0.001 | n/a | n/a |
| | and WB Marina Expwy. | PM | n/a | – | n/a | – | n/a | 0.755 | C | 0.758 | C | 0.003 | n/a | n/a |
| 20 | Mindanao Wy. | AM | n/a | – | n/a | – | n/a | 0.481 | A | 0.483 | A | 0.002 | n/a | n/a |
| | and Glencoe Ave. | PM | n/a | – | n/a | – | n/a | **1.092** | **F** | **1.100** | **F** | 0.008 | n/a | n/a |

## Table 12 (continued)
## Critical Movement Analysis Summary
## Future (2016) Without and With Project Conditions

| Int. No. | Intersection | Peak Hour | County Only Methodology: Existing Plus Ambient CMA | LOS | County Only Methodology: Existing Plus Ambient Plus Project CMA | LOS | Impact | LADOT Only Methodology: Without Project CMA | LOS | County/LADOT Methodology With Project (Includes Cumulative) CMA | LOS | Project Impact | Cumulative Impact | Project Percent of Total Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | Admiralty Wy. | AM | 0.237 | A | 0.237 | A | 0.000 | n/a | – | 0.350 | A | n/a | 0.113 | 0.0% |
| | and Fiji Wy. [2] | PM | 0.250 | A | 0.256 | A | 0.006 | n/a | – | 0.473 | A | n/a | 0.223 | 2.7% |
| 22 | Lincoln Blvd. | AM | n/a | -- | n/a | – | n/a | **0.923** | **E** | **0.925** | **E** | 0.002 | n/a | n/a |
| | and Fiji Wy. | PM | n/a | -- | n/a | – | n/a | **0.974** | **E** | **0.987** | **E** | 0.013 * | n/a | n/a |
| 23 | Culver Blvd. | AM | n/a | -- | n/a | – | n/a | 0.481 | A | 0.481 | A | 0.000 | n/a | n/a |
| | and Marina Fwy. EB Ramps | PM | n/a | -- | n/a | – | n/a | 0.563 | A | 0.571 | A | 0.008 | n/a | n/a |
| 24 | Culver Blvd. | AM | n/a | -- | n/a | – | n/a | 0.690 | B | 0.691 | B | 0.001 | n/a | n/a |
| | and Marina Fwy. WB Ramp | PM | n/a | -- | n/a | – | n/a | 0.821 | D | 0.822 | D | 0.001 | n/a | n/a |
| 25 | Lincoln Blvd. | AM | n/a | -- | n/a | – | n/a | **1.366** | **F** | **1.368** | **F** | 0.002 | n/a | n/a |
| | and Jefferson Blvd. | PM | n/a | -- | n/a | – | n/a | **1.112** | **F** | **1.123** | **F** | 0.011 * | n/a | n/a |

Notes:
[1] Unsignalized intersection; capacity assumed as 1,200 vehicles per hour.
[2] Los Angeles County intersection.
"*" Significant impact per Los Angeles County Department of Public Works *Traffic Impact Analysis Report Guidelines*, January 1, 1997, or LADOT *Traffic Study Policies and Procedures*, June 2013.

Once developed, the net additional traffic generated by the proposed project will also have an effect on the operations of the five County study intersections; as also shown in Table 12, the addition of project-related traffic is expected to result in nominal incremental increases in the CMA values at each of the subject study intersections. However, such increases will, for the most part, be relatively nominal, and the additional project-related trips are not expected to result in changes to the forecast future intersection levels of service at any of the intersections under the exclusive jurisdiction of the County. As a result, each of these intersections is forecast to continue to exhibit acceptable (LOS D or better) operations in the future year (2016) following the addition of net new traffic generated by the proposed project.

Additionally, applying the County's intersection impact significance criteria to the analysis results summarized in Table 12 indicates that the proposed project's potential significant impact at the site-adjacent intersection of Admiralty Way and Mindanao Way (during the PM peak hour under the "Existing Plus Project" conditions analyses shown earlier in Table 8) would no longer occur (reduced to less-than-significant levels), due primarily to the increase in intersection capacity resulting from completion of the ongoing installation of the new dual southbound left-turn lanes at that location. Therefore, the proposed project is not anticipated to create significant impacts at any of the five County-only study intersections under the forecast future (year 2016) conditions, and no project-specific mitigation measures are warranted for these locations.

*Project-Specific Impact Analysis – City of Los Angeles and Shared Jurisdiction Intersections*

The City of Los Angeles (LADOT) project traffic impact evaluation methodology is applicable to those 20 study intersections operated by or otherwise under either sole jurisdiction of the City (intersections 1, 2, 6 through 8, 11 through 13, 18 through 20, and 23 through 25) or exhibiting shared jurisdiction with the County (intersections 3, 4, 5, 15, 17, and 22). Unlike the County's project-impact identification methodology, which evaluates incremental project traffic additions to a future baseline condition that includes only anticipated ambient traffic growth, the City's project-specific impact evaluation methodology uses a future baseline traffic condition that includes both the anticipated annual ambient traffic growth (0.6 percent annually) and additional traffic generated by the 30 identified related projects.

As shown in Table 12 for the "LADOT Only Methodology – Without Project" conditions, by the future study year of 2016, operational levels of service at several of the City and/or City/County shared jurisdiction intersections are forecast to deteriorate from their existing conditions, primarily as a result of anticipated increases in area traffic generated by the 30 related projects identified earlier, with a total of 10 intersection exhibiting undesirable LOS E or F operations during one or both of the peak hours, five more (Washington Boulevard and Palawan Way, Washington Boulevard and Lincoln Boulevard, Lincoln Boulevard and Mindanao Way, Mindanao Way and eastbound Marina Expressway, and Lincoln Boulevard and Fiji Way) than currently exhibit such conditions. Additionally, as indicated in bold type in Table 12, four of the five new LOS E/F intersections will exhibit these undesirable operations during both the AM and PM peak hours, while the intersection of Mindanao Way and eastbound Marina Expressway will exhibit LOS E during the PM peak hour, but remain at acceptable LOS C operations during the AM peak hour. Additionally, the four intersections which currently exhibit LOS E or F conditions are forecast to continue to operate at unacceptable levels of service during the same peak periods as under the existing conditions, with both Venice Boulevard and Lincoln Boulevard, and Lincoln Boulevard and Jefferson Boulevard forecast to operate at LOS F during both the AM and PM peak hours (deteriorating from their existing LOS E and LOS D conditions, respectively, to LOS F operations during the PM peak hour), while both Washington Boulevard and Glencoe Avenue/Costco Plaza Driveway, and Mindanao Way and Glencoe Avenue will remain at LOS F during the PM peak hour, although the AM peak hour conditions at both intersections will continue to exhibit acceptable LOS D or better operations.

As with the County-only intersections described earlier, the addition of project-specific traffic at the 20 City and/or shared City/County study intersections is expected to result in relatively nominal incremental increases in the CMA values at most of the subject locations. Additionally, as shown in Table 12, similar to the project-specific impacts at the five County intersections, the additional project-related traffic would not be expected to result in changes to the forecast future (year 2016) “Without Project” intersection levels of service at any of the 20 City and/or shared City/County intersections, with the exception of the City-only intersection of Lincoln Boulevard and Marina Expressway, which could be reduced from its forecast “Without Project” acceptable LOS D operations to undesirable LOS E conditions during the PM peak hour, although this location will continue to exhibit acceptable LOS D operations during the AM peak hour.

Further, based once again on the impact evaluation criteria summarized previously in Table 9, the proposed project could result in significant impacts at a total of seven of the 20 City-only or shared City/County jurisdiction study locations; Venice Boulevard and Lincoln Boulevard, Washington Boulevard and Lincoln Boulevard, Lincoln Boulevard and Marina Expressway, Lincoln Boulevard and Mindanao Way, Mindanao Way and eastbound Marina Expressway, Lincoln Boulevard and Fiji Way, and Lincoln Boulevard and Jefferson Boulevard, each of which is significantly impacted during the PM peak hour only. As with the previously described "Existing With Project" scenario impacts, potential roadway and/or intersection improvements designed to address these significant project-related traffic impacts are described and evaluated later in the "Mitigation Measures" section of this report (no project-specific significant impacts are expected to occur under the County-only "With Ambient Growth Plus Project" scenario).

*Cumulative Impact Analysis – Los Angeles County Intersections Only*

Finally, the cumulative traffic effects of ongoing and proposed development within or surrounding the study area, including the project itself, were evaluated for the five County intersections. The future (2016) cumulative development scenario AM and PM peak hour traffic volumes include the previously-described traffic increases resulting from the anticipated annual ambient growth, traffic generated by the 30 identified related projects, and from the Parcel 44 project itself; these volumes are therefore identical to those identified for the City methodology "With Project" conditions described previously. However, in order to identify the potential cumulative effects of both project-specific and related projects' traffic additions, the forecast "With Project" (including cumulative development traffic) conditions were compared against the County's "With Ambient Growth" scenario (rather than the City's "Without Project" conditions).

The results of the analysis of these forecast cumulative conditions indicate that the addition of traffic generated by the identified 30 "related projects", along with the incremental new traffic generated by the proposed Parcel 44 project, is expected to result in substantial deterioration in the operations at one of the County-jurisdiction study intersections. As shown in Table 12, if all of the related projects identified in Table 10 are developed and occupied as currently proposed, the intersection of Admiralty Way and Via Marina could be reduced from its current acceptable operations (LOS A during the AM peak hour, LOS D during the PM peak hour) to undesirable LOS F operations during the PM peak hour (again, shown in bold text in Table 12), although this location is forecast to remain at its current LOS A conditions during the AM peak hour.

Additionally, the intersections of both Admiralty Way and Palawan Way, and Admiralty Way and Mindanao Way could exhibit declines in operational levels, from their existing LOS B to LOS D operations during the PM peak hour, although both locations are forecast to continue to exhibit good levels of service (LOS A and LOS B, respectively) during the AM peak hour. Similarly, the intersection of Admiralty Way and Bali Way could be reduced from its current LOS B conditions to LOS C operations, also during the PM peak hour, but is expected to remain at LOS A during the AM peak hour. However, despite these potential changes in level of service, the forecast cumulative conditions at each of these three locations are expected to remain at acceptable levels (LOS D or better) during both peak hours. No cumulative development-related changes to the levels of service at the intersection of Admiralty Way and Fiji Way are anticipated, as this location is forecast to continue to operate at LOS A during both the AM and PM peak hours.

Again using the intersection impact evaluation criteria shown earlier in Table 9, the significance of the incremental cumulative traffic impacts at these five County intersections were assessed. As summarized in Table 12, the anticipated cumulative development traffic additions to these County intersections (including traffic from the proposed Parcel 44 project) could produce significant impacts at four of the five subject intersections (Admiralty Way and Fiji Way is not significantly impacted), each during the PM peak hour only. Further, as noted previously, although the proposed project itself is expected to result in a significant impact at only one of these five County-only jurisdiction intersections (at Admiralty Way and Mindanao Way during the PM peak hour, under the “Existing Plus Project” scenario only), it will contribute incrementally to each of the four cumulative significant impacts to some degree, and as such, the magnitude (percent) of the Parcel 44 project’s specific contributions toward the total cumulative impacts were also identified. As indicated in Table 12, the Parcel 44 project itself is expected to contribute between approximately eight percent (Admiralty Way and Via Marina) and 21 percent (Admiralty Way and Mindanao Way) of the total incremental cumulative impacts (not cumulative volumes; it is important to make this distinction) during the PM peak hour, when each of the impacts occur. Measures designed to address these potential cumulative significant impacts are identified and analyzed later in the “Mitigation Measures” section of this report.

**Project Impacts on Regional Transportation System**

To address increasing public concern that traffic congestion was impacting the quality of life and economic vitality of the State of California, the Los Angeles County Congestion Management Program (“CMP”)[5] was enacted to provide the analytical basis for transportation decisions through the State Transportation Improvement Program (“STIP”) process. A countywide approach has been established by the Metropolitan Transportation Authority (“Metro”), the local CMP agency, to implement the statutory requirements of the CMP, and has identified a network of key roadways and intersections, including all state highways and principal arterials within the County, and has established procedures for monitoring and tracking Level of Service standards throughout the network. The CMP project traffic impact analysis (“TIA”) guidelines require

[5] *2010 Congestion Management Program for Los Angeles County*, Los Angeles County Metropolitan Transportation Authority, Los Angeles, 2010.

detailed analyses of all CMP arterial monitoring intersections where a project could add a total of 50 or more trips (all directions) during either peak hour, as well as for all freeway segments where a project could add 150 or more trips in either direction during the peak hours.

*CMP Arterial Monitoring Intersection Impacts*

As noted in the preceding discussion, the CMP requires that detailed analyses be conducted for any of these locations where the proposed project is anticipated to add 50 or more total trips during either the weekday AM or PM peak hours. The current CMP (2010) identifies eight arterial monitoring intersections within approximately three miles of the project site. Six of the CMP intersections are located within the City of Los Angeles, while one is located within the City of Santa Monica, and one is located within the City of Culver City. The eight CMP arterial monitoring intersections located within the project vicinity are listed below, and are shown in relation to the Parcel 44 project site in Figure 17.

- Lincoln Boulevard and Pico Boulevard (Santa Monica)
- Venice Boulevard and Lincoln Boulevard (Los Angeles)
- Venice Boulevard and Centinela Avenue (Los Angeles)
- Venice Boulevard and Overland Avenue (Culver City)
- Lincoln Boulevard and the Marina Expressway (SR-90) (Los Angeles)
- Lincoln Boulevard and Manchester Avenue (Los Angeles)
- Manchester Avenue and Sepulveda Boulevard (Los Angeles)
- Lincoln Boulevard and Sepulveda Boulevard (Los Angeles)

Two of the CMP arterial monitoring intersections, Venice Boulevard and Lincoln Boulevard, and Lincoln Boulevard and the Marina Expressway (intersections 1 and 13, respectively) are already examined in detail as part of the 25 study intersections analyzed earlier in this document, and therefore do not need to be re-analyzed to meet the CMP requirements. However, for the remaining six locations, the CMP requires that detailed analyses be conducted for any of these locations where the proposed project could be anticipated to add 50 or more total trips during either the AM or PM peak hours, and therefore, the potential net project-related traffic additions to each of these CMP arterial monitoring intersection locations were assessed.

A review of the project's anticipated traffic travel patterns into, out of, and through the study vicinity, shown previously in Figure 4, indicates that project traffic will disperse throughout the area roadway network outside the immediate study vicinity, and that project traffic volume

PARCEL 44 \ CMP-INTS


FIGURE 17

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CMP INTERSECTION MONITORING LOCATIONS

additions to any of the CMP monitoring intersections are expected to be substantially less than the 50-trip threshold.  Specifically, Figure 4 shows that only about five percent (5%) of the project's trips are expected to travel on Lincoln Boulevard (north of Venice Boulevard) to or from the CMP arterial monitoring intersection at Lincoln Boulevard and Pico Boulevard.  As such, based on the project's anticipated net trip generation summarized earlier in Table 2, and as shown previously in Figures 5(a) and 5(b), which depict the project's net peak hour traffic volumes at each of the study intersections, a total of only about five net new project-related trips (total both directions) are expected to travel beyond the study area and potentially affect the CMP intersection at Lincoln Boulevard and Pico Boulevard during the AM peak hour, with a total of approximately 20 net new project trips doing so during the PM peak hour.

Similarly, approximately 10 percent of the project's trips are expected to travel to or from the east of the study area on Venice Boulevard (east of Lincoln Boulevard), potentially effecting the two CMP arterial monitoring intersections at Venice Boulevard and Centinela Avenue, and Venice Boulevard and Overland Avenue.  Assuming conservatively that project traffic does not disperse onto other roadways or otherwise deviate from Venice Boulevard before it reaches these two locations, the project could result in a total of approximately nine net project trips during the AM peak hour, and a total of approximately 40 net trips during the PM peak hour travelling travel through these two CMP intersections, as again shown in Figures 5(a) and 5(b).

Finally, an additional approximately 10 percent of the project's trips are anticipated to enter or leave the study area to the south along Lincoln Boulevard (south of Jefferson Boulevard), potentially travelling through one or more of the CMP locations (Lincoln Boulevard and Manchester Avenue, Manchester Avenue and Sepulveda Boulevard, and Lincoln Boulevard and Sepulveda Boulevard) to the south of the project site.  As also shown previously in Figure 5(a), a total of approximately nine project trips are anticipated to travel along Lincoln Boulevard to or from these CMP intersections during the AM peak hour, while Figure 5(b) shows that a total of approximately 39 such project-related trips could occur during the PM peak hour.

It should be noted that these project traffic estimates are considered to be highly conservative, particularly at the more distant CMP intersections, since as noted earlier, all project traffic leaving the study area was assumed to travel through these intersections, although it is likely that project traffic will disperse into residential neighborhoods or divert to other roadways along the anticipated travel paths, reducing the amount of potential project traffic actually reaching the CMP arterial monitoring locations.  However, even using these conservative assumptions, the net project traffic additions to any of the eight nearest CMP arterial monitoring intersections will be substantially below the 50-trip threshold for requiring a detailed analysis. Further, even these conservative estimates would not result in significant impacts; the volumes are simply too small to produce measurable effects. Therefore, based on these evaluations, the net project trip additions through the nearest CMP arterial monitoring intersections will be well below the levels at which a significant impact would be created, and as such, no further analyses are warranted.

*CMP Freeway Segment Impacts*

An examination was also made of the potential for project-related freeway impacts within the project study area. The CMP requires that detailed freeway impact analyses be prepared when a project is expected to add 150 or more peak hour trips in any direction to the area freeway system. As shown previously in Table 2, the proposed project is expected to generate fewer than 150 net new directional trips during the AM peak hour, although it is anticipated to result in more than 150 net directional trips (in both the “inbound” and “outbound” directions) during the PM peak hour. However, as shown earlier in Figure 4 (Project Geographic Trip Distributions), only a fraction of the project’s total trips are anticipated to travel on the area freeways, with about 15 percent utilizing the Marina Expressway/Freeway to access the project site, while a total of approximately 15 percent of the project’s traffic will travel to and from the north of the project vicinity (north of Culver Boulevard) and an additional 10 percent will travel to and from the south of the study area (south of Jefferson Boulevard) on the San Diego (I-405) Freeway.

Based on these trip distributions, the project could increase traffic on the “freeway” segments of the Marina Expressway/Freeway (between the San Diego Freeway and Culver Boulevard) by approximately nine net westbound and five net eastbound trips to during the AM peak hour, and by approximately 30 net westbound and 29 net eastbound trips during the PM peak hour. The project could also add approximately nine net southbound and five net northbound trips during the AM peak hour, and approximately 31 net southbound and 28 net northbound trips during the PM peak hour to the segments of the San Diego Freeway north of Culver Boulevard, while the project could add approximately four net northbound trips and one net southbound trip during the AM peak hour, and 19 net northbound and 18 net southbound trips during the PM peak hour to the San Diego Freeway segments to the south of Jefferson Boulevard. Therefore, the proposed project will add fewer than 25 percent of the CMP’s minimum 150-trip (directional) peak hour thresholds to any segment of these nearby regional transportation facilities. As such, no significant freeway mainline impacts are expected, and no further analysis is warranted.

**Project Impacts on Area Transit Facilities**

As described earlier in this report, in order to present the most conservative analysis of the potential traffic impacts of the project to the nearby study intersections, no significant additional use of public transportation by project employees or visitors beyond that intrinsically included in the "Marina-specific" LUP or ITE trip generation rates was assumed. However, for purposes of assessing potential project-related impacts to the area transit system, it was assumed that up to approximately five percent (5%) of the vehicular trips generated by the proposed project could instead utilize the available existing public transportation (bus) service in the project vicinity as a regular mode of travel. This assumption is considered to be highly conservative, since most of the uses anticipated for the proposed project do not lend themselves to transit utilization.

Using this approach, the number of project trips that might travel to and from the project via the existing transit services was calculated. Based on the project trip calculations shown earlier in Table 2, it was estimated that approximately 188 of the project's net new daily trips, including four trips (three inbound, one outbound) during the AM peak hour, and 19 trips (10 inbound, nine outbound) during the PM peak hour, could potentially travel to and from the project site via the area's public transit facilities rather than traveling in privately-owned vehicles. Further assuming an average vehicle occupancy ("AVO") of 1.2 persons per vehicle (which is typical of the Southern California region) in order to convert the vehicle trips noted above to "person trips", the proposed project could result in a potential net incremental increase in area transit ridership of approximately 225 persons per day, including five persons (three inbound, two outbound) during the AM peak hour, and 23 persons (12 inbound, 11 outbound) during the PM peak hour, assuming that all project-related transit usage would occur as a result of new bus ridership.

While it is acknowledged that bus utilization in the project vicinity can be heavy during the peak weekday commute periods, this nominal level of new rider demand would likely be divided among several bus lines providing direct service to the project site. These lines alone provide a combined total of between 20 and 30 buses per hour serving the project site during both the weekday AM and PM peak commute periods, with a combined total of over 300 buses per day. As a result, the potential project-related increases in ridership on any single bus are expected to be nominal (an average of two or fewer new riders per bus during the peak commute periods). Therefore, based on the assumptions described earlier, the proposed project is not expected to result in any significant transit-related impacts to the existing bus service in the study area, and as such, no mitigation measures in this regard are warranted.

## MITIGATION MEASURES

As described in the preceding report, the proposed Parcel 44 redevelopment project could result in significant impacts at a total of eight intersections, during the PM peak hour only, under one or both of the "Existing With Project" and "Future With Project" scenarios analyzed in this study, including one location under the sole jurisdiction of the County; at the site-adjacent intersection of Admiralty Way and Mindanao Way (impacted only under the "Existing With Project" scenario), five intersections under the exclusive jurisdiction of the City of Los Angeles; Lincoln Boulevard and Venice Boulevard, and Lincoln Boulevard and Washington Boulevard (each location impacted under both the "Existing With Project" and LADOT's "Future With Project" scenarios), Lincoln Boulevard and Marina Expressway, Mindanao Way and eastbound Marina Expressway, and Lincoln Boulevard and Jefferson Boulevard (each location impacted only under LADOT's "Future With Project" scenario), and two intersections under joint County/City jurisdiction, Lincoln Boulevard and Mindanao Way (impacted under both the "Existing With Project" and LADOT's "Future With Project" scenarios), and Lincoln Boulevard and Fiji Way (impacted only under LADOT's "Future With Project" scenario).

The Marina del Rey Specific Plan ("Specific Plan"), which incorporates the recently-adopted Marina del Rey Land Use Plan ("LUP") Amendment, identifies a number of transportation and circulation improvements that are designed to mitigate the traffic generation of ongoing development in Marina del Rey, of which the proposed Parcel 44 project is a part. The LUP's "Revised Set of Intersection Improvements", which supersede the previous version of the LUP's Transportation Improvement Program ("TIP") roadway improvement measures, include both local Marina and sub-regional cumulative roadway and/or intersection improvements that are designed to address both the incremental (project-specific) and cumulative traffic impacts from all projects developed within Marina del Rey itself (including the proposed project), as well as from increases in local and regional traffic demand created by other developments outside the County's jurisdiction that utilize the Marina roadway system.

The roadway improvements identified in the current LUP are funded (in part) by a traffic impact mitigation fee imposed by the County of Los Angeles, which all projects within the Marina, including the proposed development, are required to pay. These fees provide "fair share" contributions from each Marina development project toward the identified improvements based on the number of net new PM peak hour trips generated by each project. The County's current traffic impact mitigation fee structure identifies a fee amount of $5,690 per PM peak hour trip.

Therefore, based on the anticipated project trip generation of 411 net new PM peak hour trips (per Los Angeles County Department of Public Works policy, the number of project-related trips applicable to the traffic impact mitigation fee does not include the total 24-trip PM peak hour pass-by traffic reductions used to analyze the proposed project's potential traffic impacts, as described earlier in this report), the proposed Parcel 44 redevelopment project will be required to pay a total of approximately $2,338,590 in traffic impact mitigation fees. As noted above, these fees will be applied toward the project's "fair share" costs of implementing the roadway and intersection improvements described in the Marina del Rey Specific Plan LUP.

The County's Department of Public Works has expressed that it prefers to coordinate and implement the local and regional roadway improvements identified in the Specific Plan LUP itself, in order to reduce overall construction time and minimize traffic disruptions associated with these improvements. Therefore, payment of the traffic impact mitigation fee noted above is the recommended method of addressing the proposed project's traffic impact mitigation, rather than the incremental or partial construction of any of the relevant Specific Plan roadway improvements by the project applicant. However, should the County determine that the immediate implementation of roadway improvements is necessary to address the potential project-specific traffic impacts of proposed Parcel 44 development project identified earlier, the following measures are recommended for each of the eight significantly-impacted locations.

*Project-Specific Mitigation Measures*

Los Angeles County Intersections

- o <u>Admiralty Way and Mindanao Way</u> – Although as shown earlier in Table 7, the project could result in a significant impact at this intersection during the PM peak hour under the "Existing With Project" scenario, this location was assumed only to be improved with the project-required improvements to the eastbound approach of Mindanao Way for the analysis of potential project-related impacts for that scenario. However, as described earlier in this report, the County is currently underway with, and is nearing completion on improvements to Admiralty Way that will install new southbound dual left-turn lanes at this intersection. As a result, as further shown in Table 11, once the ongoing installation of the new dual southbound left-turn lanes is completed, the project's impacts will become less-than-significant (during both peak hours). Therefore, no improvements to this intersection (beyond the project-required improvement to eastbound Mindanao Way and the ongoing improvements being installed by the County) are necessary.

Shared Los Angeles County/Los Angeles City Intersections

- Lincoln Boulevard and Mindanao Way – This intersection is under the shared jurisdiction of the County and City of Los Angeles. The "Revised Set of Intersection Improvements" contained in the updated LUP does not identify any roadway improvements for this location, although the (now-superseded) Transportation Improvement Program ("TIP") of the prior LUP included an improvement to install a new northbound right-turn only lane on Lincoln Boulevard at Mindanao Way. However, as described earlier in this report, this measure has already been installed, and a review of this intersection indicates that it currently provides exclusive left-turn and right-turn lanes, along with three through lanes, on the northbound approach, a left-turn lane, and three through lanes (including a shared through/right-turn lane) on the southbound approach, dual left-turn lanes along with two through lanes (including a shared through/right-turn lane) for the westbound approach, and two through lanes (including a shared through/right-turn lane) on the eastbound approach (eastbound left turns are prohibited at this intersection). There are no additional rights-of-way available to widen any of the intersection approaches, and as such, no feasible improvements are available at this location.

- Lincoln Boulevard and Fiji Way – This intersection is also under the shared jurisdiction of the County and City of Los Angeles, and as a result, the updated LUP does not identify any roadway improvements for this location, although the previous TIP included a measure to install a second eastbound left-turn lane on Fiji Way at Lincoln Boulevard (this recommendation has since been abandoned). This intersection currently provides dual left-turn lanes plus three through lanes (including a shared through/right-turn lane) on the northbound approach, a left-turn lane and three through lanes (including a shared through/right-turn lane) on the southbound approach, a left-turn lane, a through lane, and a right-turn only ("free right") lane on the eastbound approach, and a single lane (shared left-turn/through/right-turn lane) on the westbound approach. No additional rights-of-way are currently available, and no further improvements are feasible.

City of Los Angeles Intersections

The Marina del Rey Specific Plan does not include intersections that are not under the full or partial jurisdiction of the County, and as a result, the LUP does not identify any programmed improvements at any of the five intersections listed below, each of which is located wholly within and operated under the jurisdiction of the City of Los Angeles.

Additionally, as noted earlier in this report, all of the intersections in the study area, including the locations listed below, have been improved with the City's ATSAC/ATCS traffic signal coordination system, and as such, no further signal-related operational improvements are currently available. Further, detailed field surveys conducted at each of these intersections, which are also provided below, indicate that many of the locations currently exhibit capacity enhancements beyond the typical intersection improvements (including additional left-turn lanes or exclusive right-turn only lanes). Finally, research of these locations indicated that there are currently no additional rights-of-way available to widen any of the approaches at any of these intersections, and as such, no further improvements to address the potential project impacts at these locations are feasible.

- <u>Lincoln Boulevard and Venice Boulevard</u> – This intersection is already improved with dual left-turn lanes on each approach, in addition to exclusive right-turn only lanes on both the eastbound and westbound approaches (each with right-turn overlap phases concurrent with the northbound and southbound left-turn phases).

- <u>Lincoln Boulevard and Washington Boulevard</u> – Similar to Lincoln Boulevard and Venice Boulevard, this intersection is also currently improved with dual left-turn lanes on each approach, plus exclusive right-turn only lanes (including right-turn overlap phases concurrent with the northbound and southbound left-turn phases) on both the eastbound and westbound approaches.

- <u>Lincoln Boulevard and Marina Expressway</u> – This location is currently improved to provide both dual left-turn and dual right-turn lanes on the westbound approach of the Marina Expressway, as well as dual left-turns for southbound Lincoln Boulevard (left-turns for northbound travel are not permitted at this location).

- <u>Mindanao Way and Eastbound Marina Expressway</u> – Improvements were recently completed at this intersection to install dual left-turn lanes on the southbound approach of Mindanao Way (onto the eastbound Marina Expressway), while the eastbound approach of the Marina Expressway is flared at the intersection in order to provide an exclusive left-turn lane (in addition to its typical two through lanes).

- <u>Lincoln Boulevard and Jefferson Boulevard</u> – This intersection has recently been reconstructed to substantially enhance its capacity and operations (as mitigation for the adjacent Playa Vista development project), particularly in the northbound and southbound directions, and currently provides an exclusive right-turn only lane on the northbound approach, plus dual left-turn lanes on the southbound approach, and dual left-turn and dual right-turn lanes on the westbound approach.

Therefore, based on these observations and evaluations, of the eight potential project-specific significant impacts identified in this analysis, only the impact at the site-adjacent intersection of Admiralty Way and Mindanao Way (which occurs only under the "Existing Plus Project" analysis scenario) exhibits any feasible mitigation; the County's installation of dual left-turn lanes on the southbound approach of Admiralty Way, which is currently under construction and scheduled for completion in the first quarter of 2014, will reduce the proposed project's potential impact at this location to less-than-significant levels, and as discussed earlier and shown in Table 11, the project's impact at this intersection are not significant under the any of the future (year 2016) analysis scenarios. However, no feasible roadway or traffic signal improvements are available at any of the remaining seven locations, and as shown in Tables 13(a) and 13(b), the potential project-specific impacts at these intersections will remain significant and unavoidable.

**Table 13(a)**
**Critical Movement Analysis Summary**
**Existing (2013) With Project-Specific Mitigation Conditions**
**(Includes Los Angeles County, City of Los Angeles, and Shared Jurisdiction Intersections)**

| Int. No. | Intersection | Peak Hour | Without Project CMA | Without Project LOS | With Project CMA | With Project LOS | With Project Impact | With Project Plus Project-Specific Mit. CMA | With Project Plus Project-Specific Mit. LOS | With Project Plus Project-Specific Mit. Impact |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Venice Boulevard | AM | **1.026** | **F** | **1.028** | **F** | 0.002 | **None Feasible** | | **(Impact** |
| | and Lincoln Boulevard | PM | **0.944** | **E** | **0.954** | **E** | 0.010 * | | **Unchanged)** | |
| 7 | Washington Boulevard | AM | 0.819 | D | 0.822 | D | 0.003 | **None Feasible** | | **(Impact** |
| | and Lincoln Boulevard | PM | 0.897 | D | **0.914** | **E** | 0.017 * | | **Unchanged)** | |
| 16 | Admiralty Way | AM | 0.565 | A | 0.556 | A | -0.009 | 0.556 | A | -0.009 |
| | and Mindanao Way [1], [2] | PM | 0.669 | B | 0.721 | C | 0.052 * | 0.672 | B | 0.003 |
| 17 | Lincoln Boulevard | AM | 0.847 | D | 0.851 | D | 0.004 | **None Feasible** | | **(Impact** |
| | and Mindanao Way [3] | PM | 0.861 | D | 0.891 | D | 0.030 * | | **Unchanged)** | |

Notes:

[1] Los Angeles County intersection.

[2] "Mitigation" includes only ongoing County-installed dual southbound left-turn lanes on Admiralty Way.

[3] Shared County/City of Los Angeles intersection.

"*" Significant impact per Los Angeles County Department of Public Works *Traffic Impact Analysis Report Guidelines* , January 1, 1997, or LADOT *Traffic Study Policies and Procedures* , June 2013.

**Table 13(b)**
**Critical Movement Analysis Summary**
**Future (2016) With Project Plus Project-Specific Mitigation**
**(City of Los Angeles or Shared County/City Intersections Only)**

| Int. No. | Intersection | Peak Hour | Without Project CMA | Without Project LOS | With Project CMA | With Project LOS | With Project Impact | With Project Plus Project-Specific Mit. CMA | With Project Plus Project-Specific Mit. LOS | With Project Plus Project-Specific Mit. Impact |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Venice Boulevard | AM | **1.159** | **F** | **1.161** | **F** | 0.002 | **None Feasible** | | **(Impact** |
| | and Lincoln Boulevard | PM | **1.139** | **F** | **1.150** | **F** | 0.011 * | | **Unchanged)** | |
| 7 | Washington Boulevard | AM | **0.974** | **E** | **0.978** | **E** | 0.004 | **None Feasible** | | **(Impact** |
| | and Lincoln Boulevard | PM | **1.109** | **F** | **1.126** | **F** | 0.017 * | | **Unchanged)** | |
| 13 | Lincoln Boulevard | AM | 0.821 | D | 0.823 | A | 0.002 | **None Feasible** | | **(Impact** |
| | and Marina Expressway | PM | 0.892 | D | **0.904** | **E** | 0.012 * | | **Unchanged)** | |
| 17 | Lincoln Boulevard | AM | **1.011** | **F** | **1.015** | **E** | 0.004 | **None Feasible** | | **(Impact** |
| | and Mindanao Way | PM | **1.069** | **F** | **1.109** | **F** | 0.040 * | | **Unchanged)** | |
| 18 | Mindanao Way | AM | 0.718 | C | 0.720 | C | 0.002 | **None Feasible** | | **(Impact** |
| | and EB Marina Expressway | PM | **0.915** | **E** | **0.933** | **F** | 0.018 * | | **Unchanged)** | |
| 22 | Lincoln Boulevard | AM | **0.923** | **E** | **0.925** | **E** | 0.002 | **None Feasible** | | **(Impact** |
| | and Fiji Way | PM | **0.974** | **E** | **0.987** | **E** | 0.013 * | | **Unchanged)** | |
| 22 | Lincoln Boulevard | AM | **1.366** | **E** | **1.368** | **E** | 0.002 | **None Feasible** | | **(Impact** |
| | and Jefferson Boulevard | PM | **1.112** | **E** | **1.123** | **E** | 0.011 * | | **Unchanged)** | |

Notes:
"*" Significant impact per LADOT *Traffic Study Policies and Procedures* , June 2013.

*Cumulative Mitigation Measures*

In addition to the project-specific traffic impacts described in the preceding section of this report, the analysis of potential cumulative traffic impacts at the five study intersections under the exclusive jurisdiction of the County also indicated that traffic resulting from total development throughout the project vicinity, including the proposed project as well as projects located in the City of Los Angeles (and outside the County's jurisdiction), could produce significant impacts at four locations; Admiralty Way and Via Marina, Admiralty Way and Palawan Way, Admiralty Way and Bali Way, and Admiralty Way and Mindanao Way, each during the PM peak hour only.

As described earlier, the roadway improvements identified in the current LUP are designed to address traffic growth due to cumulative development within and surrounding the Marina, and the traffic impact mitigation fees identified in the LUP $5,690 per net PM peak hour trip) are designated toward implementation of these measures. Therefore, payment of the proposed Parcel 44 project's $2,338,590 Marina del Rey traffic impact mitigation fee (described and calculated earlier in this section) is intended to mitigate the proposed project's incremental contributions toward cumulative traffic growth and its resulting impacts in the study area.

As such, the roadway improvements listed in the LUP (and funded by the traffic impact mitigation fees) were reviewed to identity which measures may be effective in addressing the cumulative impacts in the study area. These roadway improvements are described below.

- Admiralty Way and Via Marina – Two potential roadway improvement alternatives are identified in the Specific Plan to address cumulative traffic impacts at this intersection:

    1) The first roadway improvement alternative ("LUP A") includes the installation of a third left-turn lane (in addition to the two existing right-turn only lanes) on the westbound approach of Admiralty Way at Via Marina, and would also convert one of the three existing southbound through lanes to a new left-turn lane (resulting in a final southbound configuration of two left-turn lanes and two through lanes). The northbound approach of this intersection would remain unchanged, and continue to provide two through lanes and one right-turn only lane. The Specific Plan does not identify whether roadway widenings are necessary to implement this improvement.

    2) The second alternative ("LUP B") would reconstruct this intersection to realign Admiralty Way and the south leg of Via Marina to operate as a "through roadway", with the north leg of Via Marina intersecting the realigned Admiralty Way/Via Marina roadway in a "T" configuration. The resulting intersection would include two through lanes in each direction along realigned Admiralty Way/Via Marina, with one westbound right-turn lane and dual eastbound left-turn lanes from this roadway onto the north leg of Via Marina, while the southbound approach of Via Marina at the intersection would provide two left-turn lanes and a single right-turn lane.

- Admiralty Way and Palawan Way – There are also two potential roadway improvements identified in the Specific Plan's LUP to address the cumulative impact at this intersection:

    1) In addition to the current County improvements to restripe northbound Palawan Way to convert the existing left-turn lane to a shared left-turn/through lane (with the existing shared through/right-turn lane remaining unchanged), and to add a new exclusive westbound right-turn only lane on Admiralty Way, the first improvement

alternative ("LUP A") would restripe the southbound approach of Palawan Way to convert the existing through lane to a shared left-turn/through lane (but leave the existing left-turn and right-turn lanes unchanged), and would further improve the westbound approach of Admiralty Way to provide an additional through lane (west of the intersection with Palaway Way). This alternative improvement would also convert the new westbound right-turn only lane to a shared through/right-turn lane, to provide a future lane configuration of one left-turn lane, two through lanes, and one shared through/right-turn lane. The eastbound approach would continue to exhibit its current configuration of one left-turn lane, one through lane, and one shared through/right-turn lane. As with the ongoing improvement at this location, due to the proposed "shared through/left-turn lane" configuration for southbound Palawan Way, this alternative will require modification of the existing traffic signal to provide north/south opposed phasing operation.

2) The second Specific Plan roadway improvement alternative ("LUP B") is similar to the LUP A alternative described above, and would again modify westbound Admiralty Way to provide a third westbound lane west of the intersection, and convert the new westbound right-turn only lane to a shared through/right-turn lane (again with no changes to the eastbound approach lane configuration). However, this alternative would also restripe northbound Palawan Way to convert the existing shared through/right-turn lane to an exclusive right-turn only lane, while keeping the new shared left-turn/through lane currently being constructed. Additionally, this alternative would modify the southbound approach of Palawan Way to add a second left-turn lane (resulting in a final southbound lane configuration of two left-turn lanes, one through lane, and one right-turn only lane). As with the LUP A alternative, the traffic signal would be modified to operate with opposed north/south phasing.

- <u>Admiralty Way and Bali Way</u> – The LUP improvement to add a second left-turn lane on southbound Admiralty Way at Bali Way, resulting in a final lane configuration for this approach of two left-turn lanes, one through lane, and one shared through/right-turn lane is currently under construction, and no further improvements are proposed.

- <u>Admiralty Way and Mindanao Way</u> – In addition to the ongoing improvements to this intersection being installed by the County to provide a second southbound left-turn lane on Admiralty Way at Mindanao Way, and the project-required improvement to widen the south side of Mindanao Way to install a new shared through/right-turn lane on the eastbound approach of this street (and convert the current shared through/right-turn lane to a shared left-turn/through lane) described earlier (which is also part of the overall LUP improvement at this location), the remaining LUP improvements at this intersection would restripe the westbound approach of Mindanao Way to convert the existing shared left-turn/through lane to a shared left-turn/through/right-turn lane. The traffic signal phasing at this location will continue to exhibit the current east-west "split" phase operations, due to the proposed new eastbound/westbound lane configurations.

Similar to the "project-specific" mitigation measures described earlier, the effectiveness of these recommended cumulative impact mitigation measures was evaluated, again using the same intersection analysis techniques as described previously, but assuming that the recommended cumulative roadway improvement measures described above were installed. The results of the "With Cumulative Mitigation" analysis are summarized in Table 14.

**Table 14**
**Critical Movement Analysis Summary**
**Future (2016) With Cumulative Development Plus Cumulative Mitigation Conditions**
**(Los Angeles County Intersections Only)**

| Int. No. | Intersection | Peak Hour | Existing Plus Ambient Growth Only CMA | Existing Plus Ambient Growth Only LOS | With Cumulative Development CMA | With Cumulative Development LOS | With Cumulative Development Impact | Mit. Alt. | With Cumulative Development Plus Cumulative Mitigation CMA | With Cumulative Development Plus Cumulative Mitigation LOS | With Cumulative Development Plus Cumulative Mitigation Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Admiralty Way | AM | 0.418 | A | 0.515 | A | 0.097 | LUP A | 0.384 | A | -0.034 |
| | and Via Marina | PM | 0.847 | D | **1.018** | **F** | 0.171 * | | 0.648 | B | -0.199 |
| | | | | | | | | LUP B | 0.701 | C | 0.283 * |
| | | | | | | | | | 0.783 | C | -0.064 |
| 10 | Admiralty Way | AM | 0.431 | A | 0.595 | B | 0.164 | LUP A | 0.558 | A | 0.127 |
| | and Palawan Way | PM | 0.673 | B | 0.847 | D | 0.174 * | | 0.727 | C | 0.054 * |
| | | | | | | | | LUP B | 0.581 | A | 0.150 |
| | | | | | | | | | 0.712 | C | 0.039 |
| 14 | Admiralty Way | AM | 0.538 | A | 0.596 | A | 0.058 | | No Change [1] | | |
| | and Bali Way | PM | 0.621 | B | 0.791 | C | 0.170 * | | | | |
| 16 | Admiralty Way | AM | 0.578 | A | 0.655 | C | 0.077 * | | 0.610 | B | 0.032 |
| | and Mindanao Way | PM | 0.649 | B | 0.893 | D | 0.244 * | | 0.841 | D | 0.192 * |

Notes:
"*" Significant impact per Los Angeles County Department of Public Works *Traffic Impact Analysis Report Guidelines*, January 1, 1997.
[1] LUP improvement currently under construction, and is included in baseline "With Cumulative Development" scenario.

As shown in Table 14, the potential PM peak hour significant traffic impact resulting from the anticipated increases in traffic due to ambient traffic growth and the addition of traffic generated by cumulative development in the project vicinity (including the proposed Parcel 44 project) can be reduced to a less-than-significant level at the intersection of Admiralty Way and Via Marina through implementation of LUP alternative improvement "A"; LUP alternative improvement "B" would reduce the cumulative PM peak hour impact at this location to less-than-significant levels, but would actually create a new secondary significant impact during the AM peak hour. Similarly, installation of LUP alternative improvement "B" at Admiralty Way and Palawan Way would reduce the PM peak hour cumulative impact at this location to less-than-significant levels, while LUP alternative improvement "A" would reduce but not fully mitigate the impact. Therefore, it is recommended that LUP alternative improvement "A" be installed at the intersection of Admiralty Way and Via Marina, while LUP alternative improvement "B" be implemented at the intersection of Admiralty Way and Palawan Way in order to address the potential impacts of forecast future traffic growth in the project vicinity.

However, as also shown in Table 14, the intersection improvements identified in the current Marina del Rey LUP update are not expected to be sufficient to mitigate the anticipated cumulative impacts at the two site-adjacent intersections of Admiralty Way and Bali Way, and Admiralty Way and Mindanao Way. Further, an examination of these locations indicated that there are no additional feasible roadway improvement or mitigation alternatives available beyond the measures identified in the updated LUP, and as a result, the potential cumulative traffic impacts at both intersections will remain significant and unavoidable (although it is important to note that, as described earlier in this section, the project-specific impacts of the proposed Parcel 44 project at Admiralty Way and Mindanao Way will be fully mitigated, and no project-specific impacts are identified at the intersection of Admiralty Way and Bali Way).

Nonetheless, as also shown in Table 14, it should be recognized that, while not fully mitigating all potential traffic impacts associated with anticipated cumulative development in and around the Marina, the implementation of the recommended LUP update roadway improvements at the intersection of Admiralty Way and Mindanao Way are expected to maintain the operations of the intersection at acceptable LOS D conditions during the PM peak hour (and LOS B operations during the AM peak hour) even with the increases in vehicular demands at this location due to the addition of traffic associated with cumulative development in the area. Additionally, the recommended ongoing LUP improvement at Admiralty Way and Bali Way (to also install new dual left-turn lanes for southbound Admiralty Way) are anticipated to keep the operations of that intersection at acceptable forecast LOS C conditions during the PM peak hour (and at LOS A during the AM peak hour). Further, as also shown in Table 14, the two other County-jurisdiction intersections significantly impacted by cumulative development (Admiralty Way and Via Marina, and Admiralty Way and Palawan Way) are also anticipated to operate at acceptable levels of service (LOS D or better) during both peak hours following the implementation of either of the two LUP alternative mitigation measures at these intersections (including those alternatives that do not fully mitigate the potential cumulative impacts); the remaining County-jurisdiction intersection of Admiralty Way and Fiji Way, which is not anticipated to experience any significant cumulative traffic impacts, is forecast to exhibit acceptable operational conditions during both peak hours without any additional roadway improvements. As such, while potential significant cumulative traffic impacts may remain at the site-adjacent intersections of Admiralty Way and Mindanao Way, and Admiralty Way and Bali Way following implementation of the LUP intersection and/or roadway improvements identified for these location, these measures will result in benefits to the traffic flows in the project vicinity and throughout the Marina, and reduce the potential for future vehicular queuing and congestion in the study area.

As described earlier, the County Department of Public Works has historically expressed that it prefers to implement the roadway improvements identified in the Marina del Rey LUP, of which both the project-specific and cumulative mitigation measures recommended are a part, as a single major roadway improvement project in order to minimize traffic disruptions and reduce construction time. As such, payment of the identified traffic impact mitigation fee is the recommended approach to address both the project-specific as well as cumulative impacts of the proposed Parcel 44 project, rather than the actual construction of any of the improvements by the project itself. However, it should also be noted that no feasible alternative improvements to either the project-specific or cumulative mitigation measures, beyond those already described, have been identified at any of the significantly impacted intersections. Therefore, should the recommended mitigation improvement(s) not be accepted by the County, the potential traffic impacts identified in this analysis would remain significant and unavoidable.

*Additional Non-Mitigation Roadway and/or Infrastructure Improvements*

In addition to these intersection and roadway improvements, which are recommend specifically to address both the project-specific and cumulative traffic impacts (including those from the proposed project itself), as described earlier in the “Project-Required Roadway Improvements” section of this report, the proposed project will also be required to implement a number of upgrades and/or improvements to the existing roadways, sidewalks and other transportation infrastructure facilities adjacent to the site to the satisfaction of the County's Department of Public Works. These additional measures, which are not necessarily associated with any specific traffic impacts produced by the proposed project, but which will enhance vehicular traffic flows into and out of the project site, and/or improve safety for bicycle and pedestrian activity in the immediate project area, are summarized for convenience in the following paragraphs.

As part of its development, the project proposes to construct a new site access driveway on Admiralty Way (eliminating the two existing driveways along this frontage), approximately opposite an existing driveway and opening in the median island that provide access to an existing medical/commercial office development on the east side of the street. The construction of the new project driveway will also include the installation of a new northbound left-turn lane at the existing median opening on Admiralty Way, to allow vehicles to enter the site from that direction of Admiralty Way (a move that is currently not allowed). Additionally, the project will construct a new deceleration lane on the Admiralty Way approach to the site driveway, to minimize disruptions to southbound through traffic flows from project-related traffic slowing to enter the project's new driveway. It should be noted that, although the analyses summarized in this report indicate that installation of a traffic signal at the project's new Admiralty Way driveway is not warranted either under current (year 2013) or foreseeable future (year 2020) conditions, the County Department of Public Works has noted that the approval of the proposed project should include a condition that, should the project desire it, or if actual future traffic conditions trigger the need for a traffic signal at this location within a designated period of time (recommended by the County as a five-year period), the proposed project should be responsible for the design and construction/installation of such a signal.

Other project site access-related improvements include modifications to several median islands along each of the site frontages (Admiralty Way, Mindanao Way, and Bali Way) to provide new openings in the medians to allow access to and from the site driveways, or to extend the existing medians to close openings adjacent to some of the existing driveways that will be removed as part of the project. The proposed project will also be required to improve the existing sidewalks adjacent to the project site to provide an eight-foot wide sidewalk along the entire Admiralty Way frontage, along with eight-foot wide sidewalks between Admiralty Way and the existing Marvin Braude Bike Path, and five-foot wide sidewalks provided along the remainder of the project frontages on both Mindanao Way and Bali Way. Modifications will also be required along the project's Mindanao Way frontage to reduce the width of the median islands by approximately two feet (from the existing six feet to four feet), including removal of the existing median trees and their replacement with compatible plantings, in order to provide for two westbound travel lanes along this segment of the roadway, and to increase the curb return radii adjacent to the project site at the intersections of Admiralty Way and Mindanao Way, and at Admiralty Way and Bali Way from 25 feet to 35 feet. Further, the County has indicated that it will require the project to improve the intersection of Admiralty Way and Mindanao Way by widening the south side of Mindanao Way west of Admiralty Way to install a third eastbound travel lane (this measure is a part of the programmed LUP improvements at this intersection).

The County has also indicated that it will require the project to provide several additional improvements that are not related specifically to the project's operations or potential impacts. These include, at a minimum, improvements to the existing Marvin Braude Bike Path crossings at both Bali Way and Mindanao Way to install new speed humps in advance of the bicycle path crossing in both directions on both streets. Additional upgrades may also include elevating the bicycle crossing slightly above the grade of the roadways (such as with a speed table or other such device), installation of flashing lights and improved signage indicating a bicycle crossing, colored or textured pavement treatments for the crossings, or a combination of these or other measures, although no specific improvements have yet been identified by the County.

Finally, both the County Department of Public Works, an Department of Beaches and Harbors have indicated that the existing (non-project) access driveways to both Public Parking Lot No. 5 (on the north side of Bali Way) and to the parking lot serving the Marina del Rey Visitor's Center (on the south side of Mindanao Way) should be relocated in order to align these driveways opposite the new proposed project driveways, as well as to minimize future conflicts between both existing and project-related vehicular traffic and bicyclists/pedestrians using the bike path.

As noted earlier in this report, while conceptual roadway and other infrastructure improvements proposed by the project and/or required by the County are shown in Figure 7, detailed plans of all requested/required roadway improvement measures will be submitted to both the County's Department of Public Works, and Department of Beaches and Harbors for review and approval, with all agreed-upon improvements required to be completed, to the satisfaction of the County, prior to the issuance of any certificates of occupancy for any of the proposed project.

*Parking-Related Mitigation Measures*

Finally, as also described earlier in this study, the proposed project will include approximately 477 on-site vehicular parking spaces (including a total of approximately 34 tandem spaces) and 76 bicycle parking spaces to serve its various uses. While the number of bicycle spaces is adequate to meet the County's current Zoning Code, the number of vehicular parking spaces proposed will be about seven (7) spaces deficient of the 484 vehicular parking spaces required for the new development (including both the landside and waterside portions of the redevelopment project). However, a shared parking analysis prepared for the proposed project, accounting for the variability in parking needs for the various project components throughout the day, indicates that the actual maximum parking demands anticipated for the new development will be somewhat lower than that identified using the "static" Zoning Code parking ratios, with a peak demand of approximately 457 vehicular parking spaces, or about 20 spaces fewer than are proposed to be provided. As such, the project's proposed 477-space parking supply will be sufficient to accommodate the anticipated peak parking demand periods, which occur generally during an approximately two-hour period in the middle part of a typical weekday (the project's peak weekend vehicular parking demands are expected to be considerably lower, at a maximum of approximately 398 spaces), and as such, no on-site parking shortages or "overflow" parking onto adjacent streets or public parking areas are anticipated.

It is important to note that the shared parking analyses also indicated that, during the peak weekday parking demand activity (from approximately 12:00 noon to 12:00 PM), the total parking demands for the project are expected to exceed the 443 "self-park" spaces provided (not counting the 34 tandem spaces), and therefore will necessitate use of approximately 20 of the tandem spaces to accommodate the anticipated parking demands during this period. However, throughout the remainder of the typical weekday activity, the total project parking demands are expected to be less than 443 spaces, and as such, use of tandem spaces will not be needed, and all project-related parking can be accommodated within the "self-park" spaces. Therefore, it is recommended that any valet or parking attendant assisted parking for the project be required only during the peak weekday parking activity periods from approximately 11:00 AM to about 3:00 PM. No use of the tandem spaces will be necessary on weekends, and as such, no valet or attendant assisted parking requirement is warranted.

*Other Project-Impact Mitigation Measures*

A review of the proposed configuration and anticipated operation of the project's on-site parking and internal vehicular circulation scheme indicates that it will be acceptable, and will provide sufficient driveway entry and exit capacity at all site access locations to accommodate the anticipated site-related traffic demands. Further, both on-street and internal (on-site) vehicular queuing and/or congestion is expected to be minimal, and no significant impacts with respect to site access or internal vehicular circulation are anticipated. Additionally, the installation of the improvements to the site-adjacent bicycle path expected to be required by the County is expected to address any potential existing or future (project-related) impacts to bicycle and pedestrian activity in the project vicinity. As such, no project site access-related or on-site vehicular, pedestrian, or bicycle mitigation measures, other than the driveway and/or median island modification described earlier in this study, are warranted.

Finally, the proposed Parcel 44 redevelopment project is not anticipated to produce sufficient net new traffic to create significant impacts to any of the surrounding CMP arterial monitoring intersections or freeway segments, nor are any significant impacts to the public transit facilities serving the study area anticipated. Therefore, no project mitigation measures associated with either of these issues are necessary.

**APPENDICES**

**(Contained in Separate Document)**

# TRAFFIC IMPACT ANALYSIS REPORT - APPENDIX VOLUME I (A-F)

## Proposed Commercial Redevelopment of Parcel 44
## on Admiralty Way between Bali Way and Mindanao Way
## in Marina del Rey, California

**Prepared for:**

**Pacific Ocean Management, LLC**
**13575 Mindanao Way**
**Marina del Rey, California 90292**

**Prepared by:**


HIRSCH GREEN

Hirsch/Green Transportation Consulting, Inc.

13333 Ventura Boulevard, #204
Sherman Oaks, California 91423


REGISTERED PROFESSIONAL ENGINEER
RONALD R. HIRSCH
NO. 2318
6-30-2015
TRAFFIC
STATE OF CALIFORNIA

**OCTOBER 2013**

# APPENDIX A

## INDIVIDUAL PROJECT COMPONENT AND EXISTING USES
## TRIP ASSIGNMENT PERCENTAGES
## AND
## AM AND PM PEAK HOUR TRAFFIC VOLUMES

# Individual Project Component and Existing Use Trip Assignment Percentages

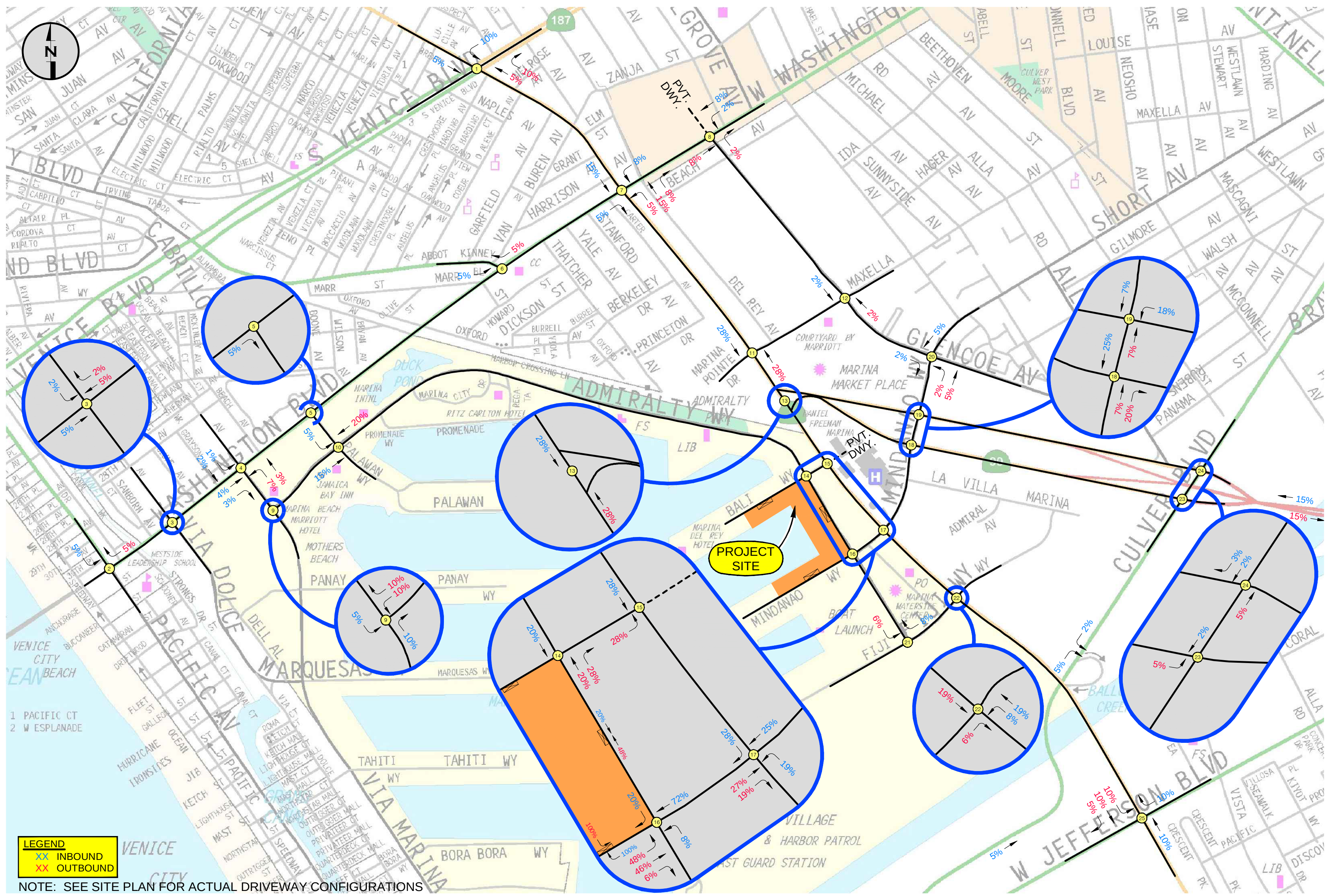



FIGURE A-1(a)

PARCEL 44
TRIP ASSIGNMENT PERCENTAGES
PROPOSED PROJECT USES (BUILDING II - TRADER JOES)

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

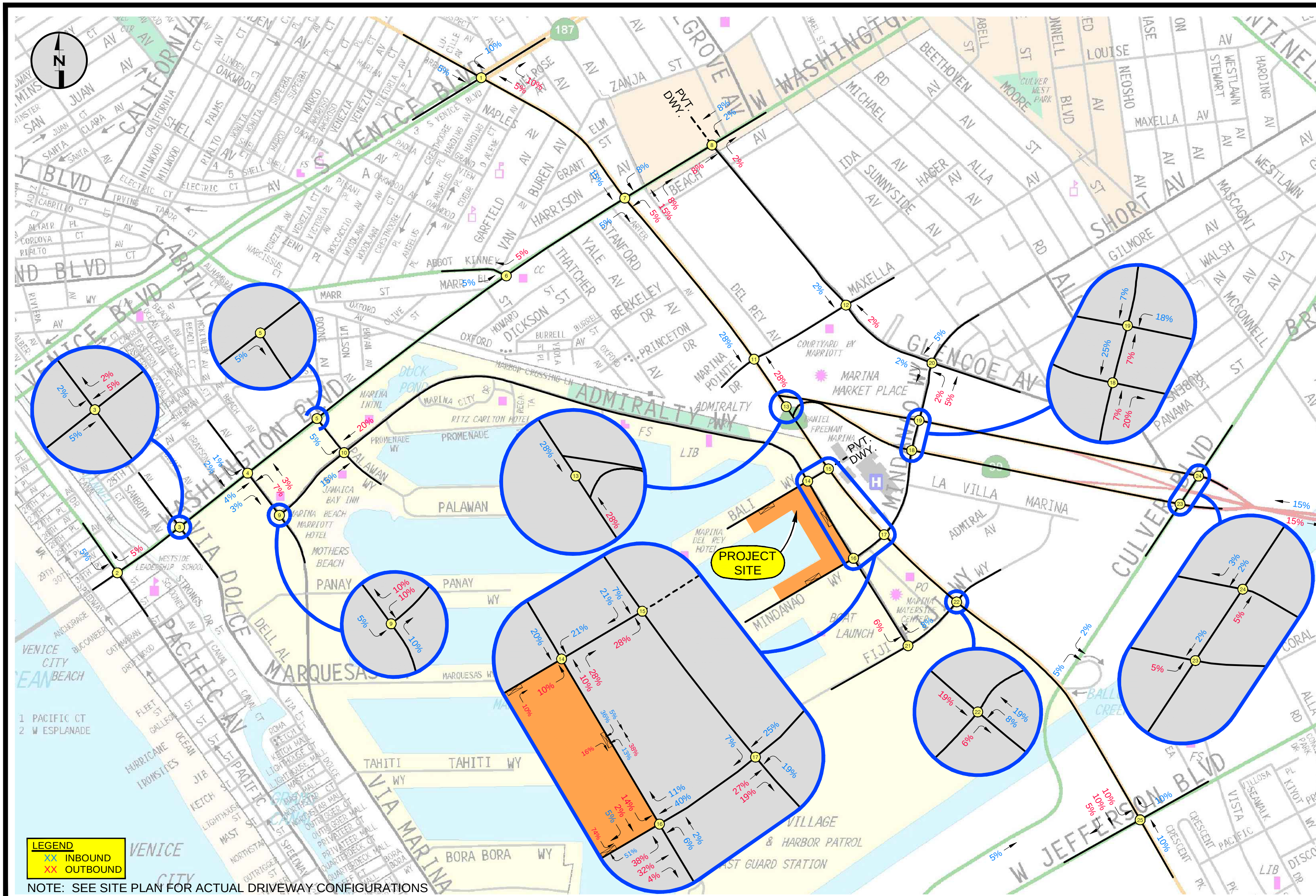



FIGURE A-1(b)

PARCEL 44
TRIP ASSIGNMENT PERCENTAGES
PROPOSED PROJECT USES (BUILDING IV - WEST MARINE)

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

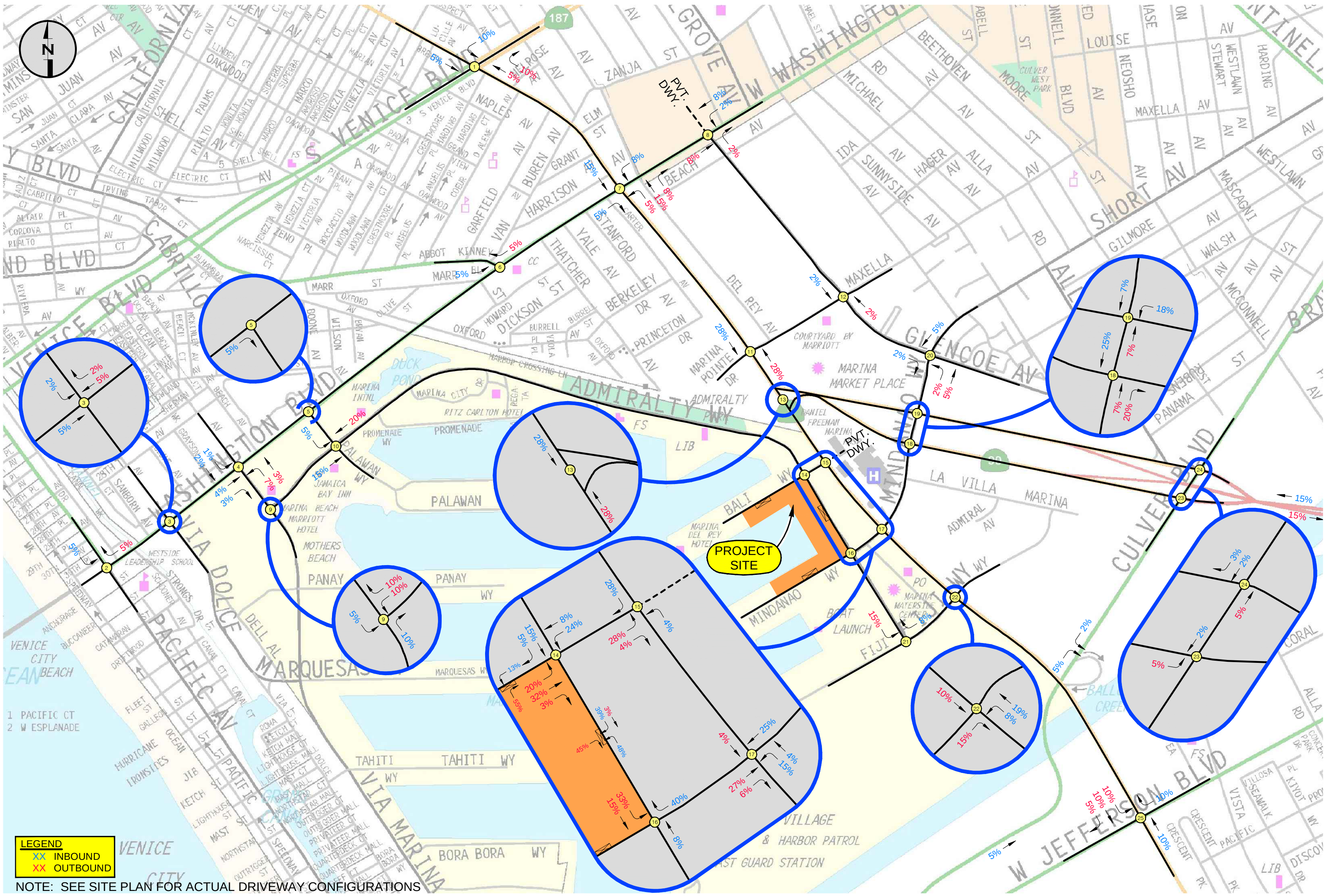



FIGURE A-1(c)

PARCEL 44
TRIP ASSIGNMENT PERCENTAGES
PROPOSED PROJECT USES (BUILDING V & VI - RETAIL & RESTAURANT)

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

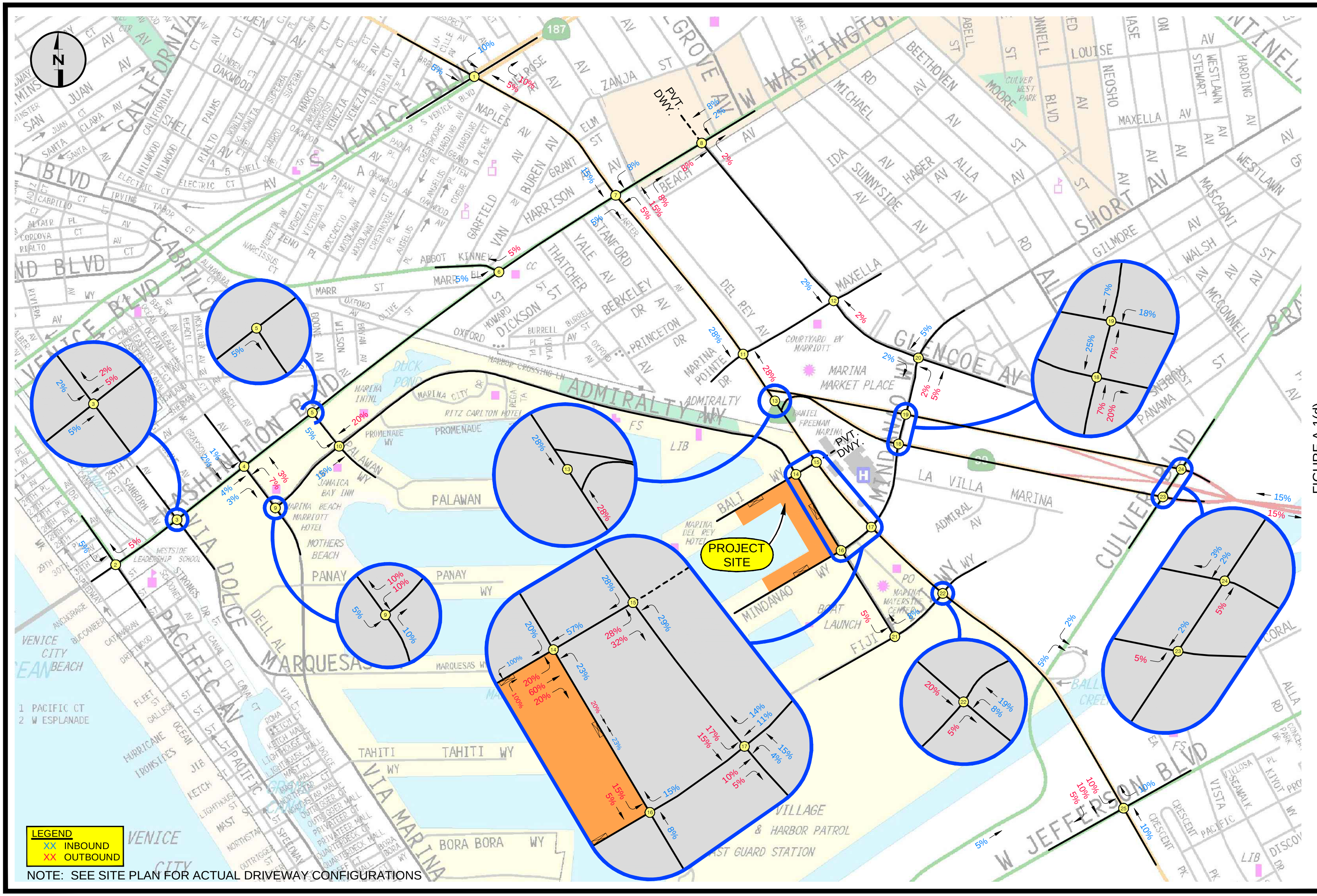



FIGURE A-1(d)

PARCEL 44
TRIP ASSIGNMENT PERCENTAGES
PROPOSED PROJECT USES (BUILDING VIII - BOAT REPAIR/STORAGE)

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

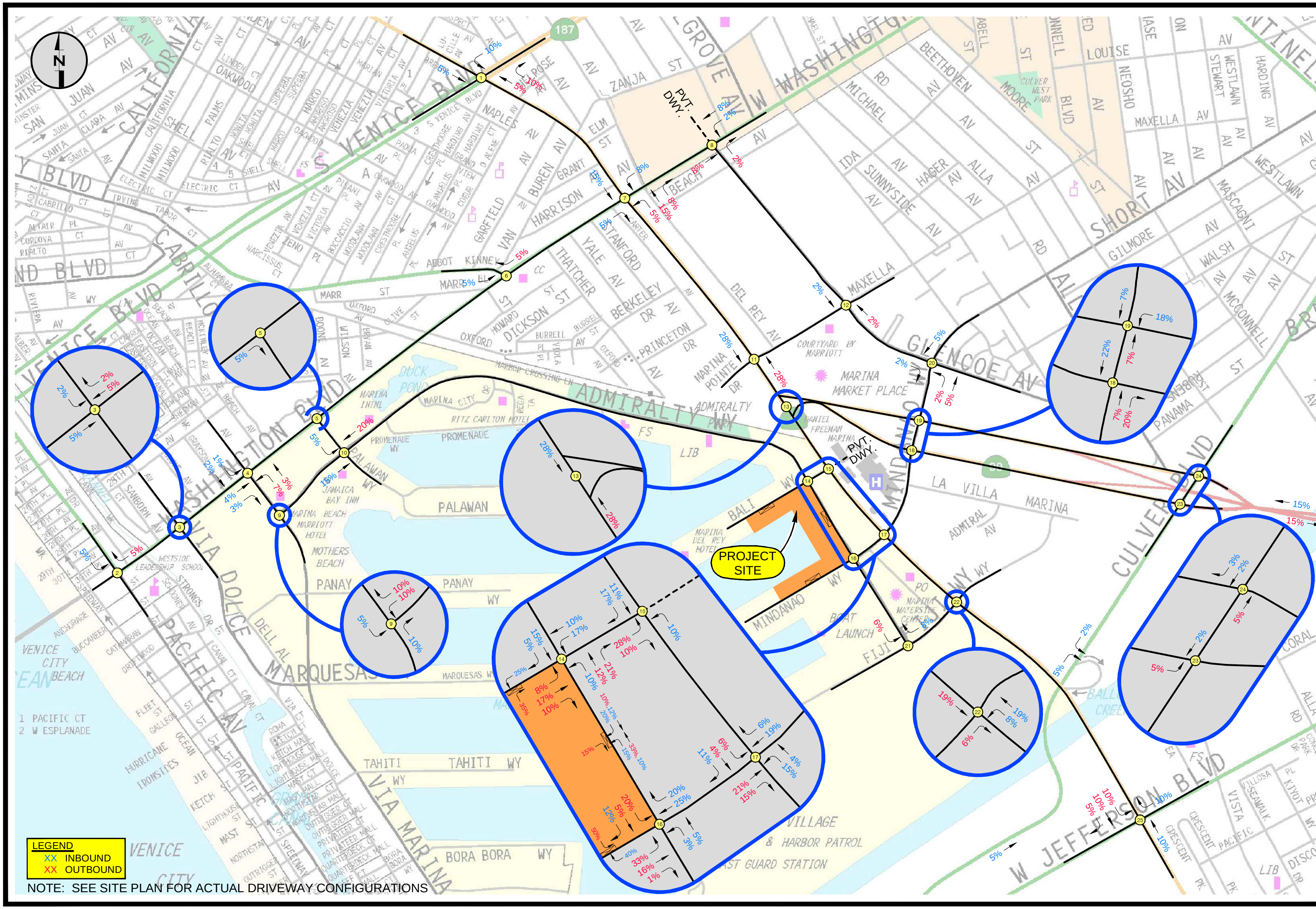



FIGURE A-1(e)

PARCEL 44
TRIP ASSIGNMENT PERCENTAGES
PROPOSED PROJECT USES (BOAT SLIPS)

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

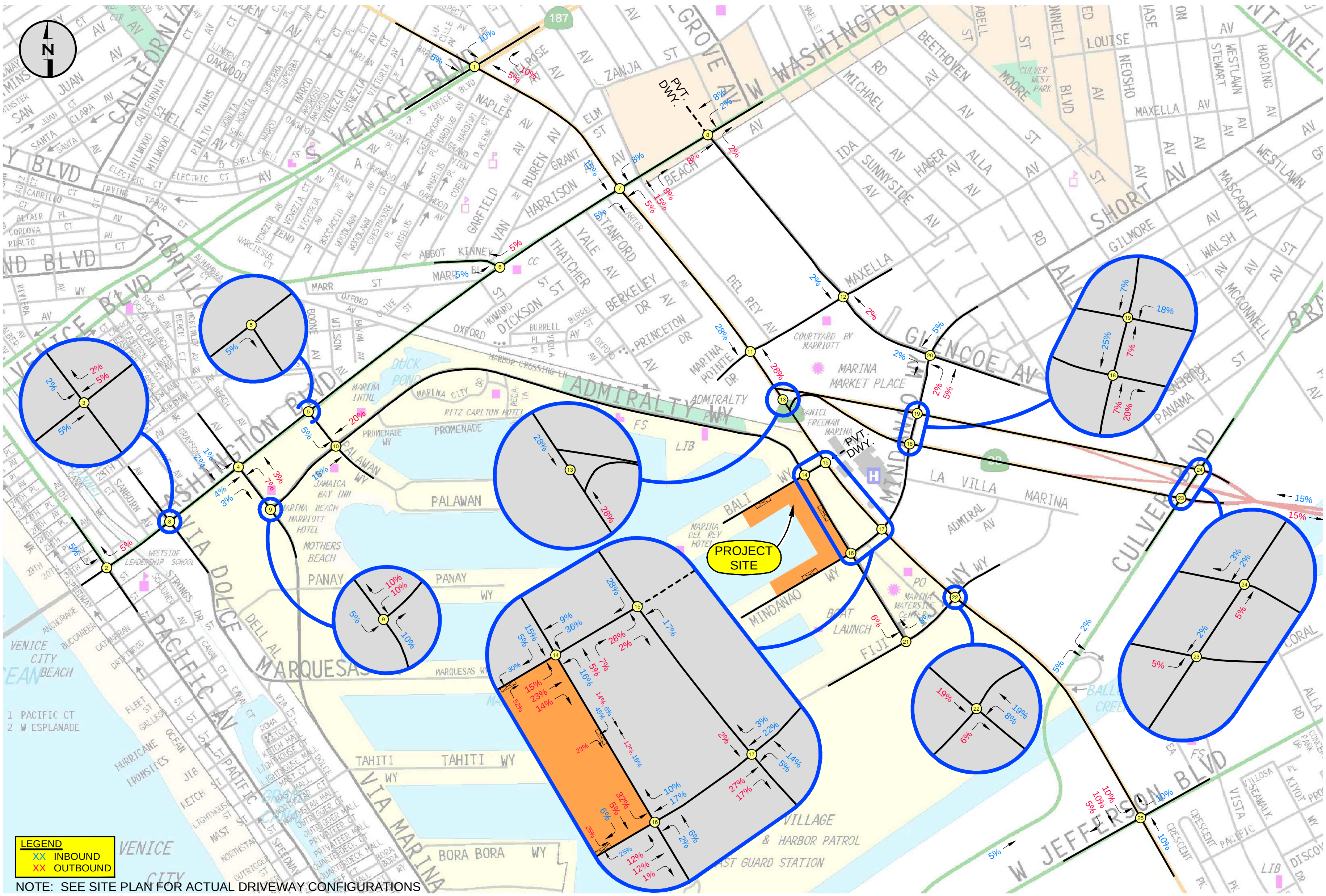



FIGURE A-1(f)

PARCEL 44
TRIP ASSIGNMENT PERCENTAGES
EXISTING PROJECT SITE USES

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

**Individual Project Component and Existing Uses Trip Assignments**

# AM Peak Hour

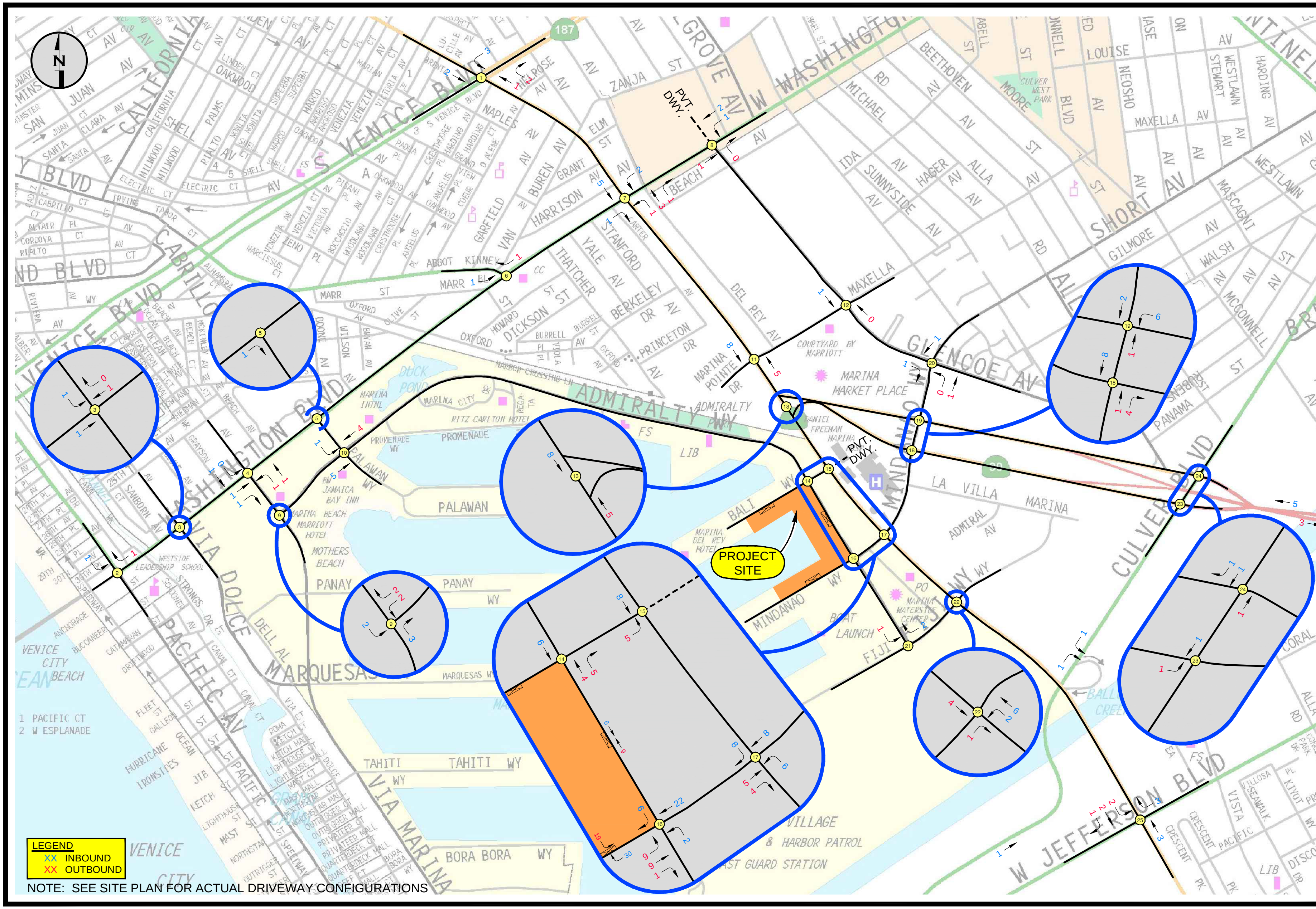



FIGURE A-2(a)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDING II - TRADER JOES)
AM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.

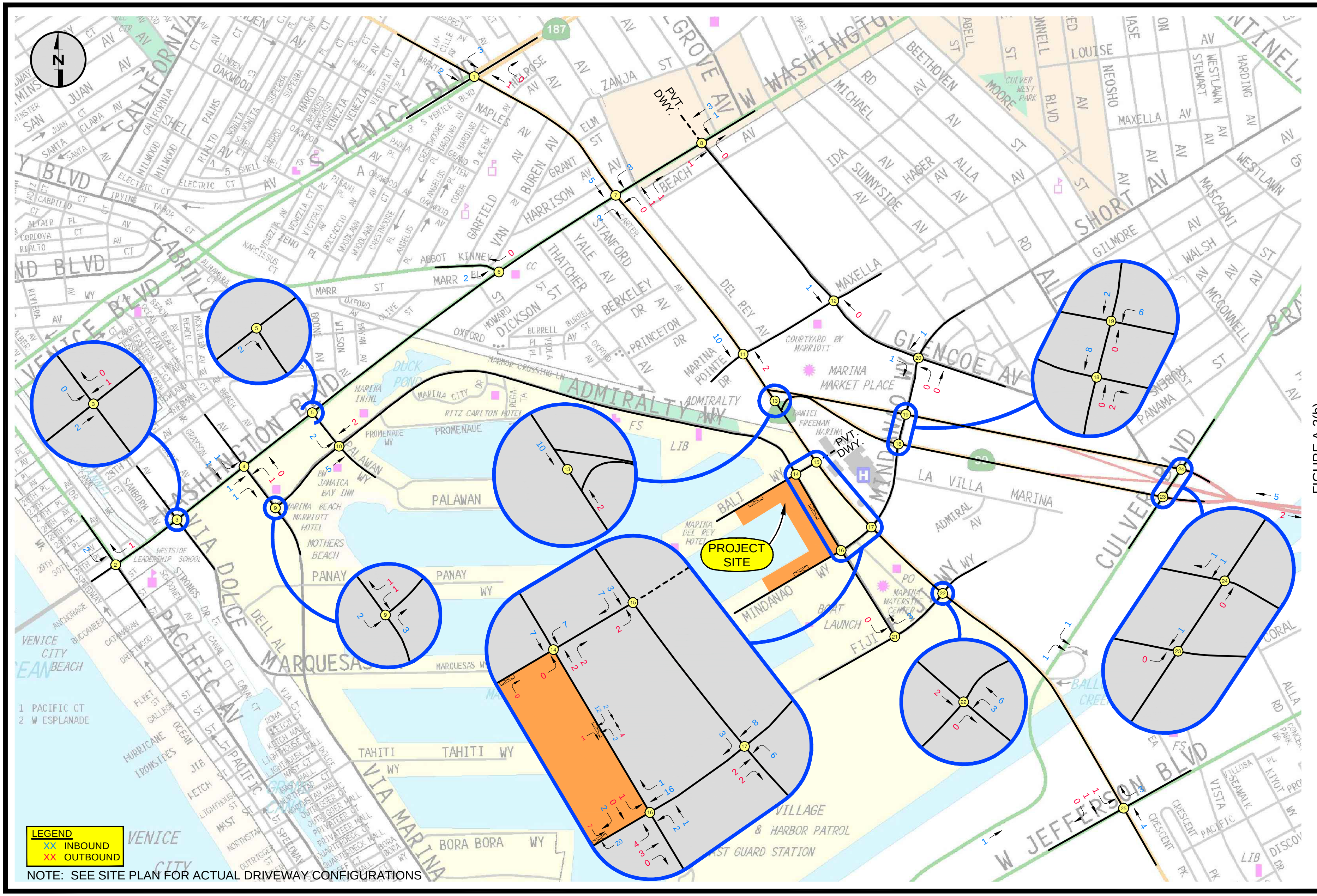



FIGURE A-2(b)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDING IV - WEST MARINE)
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

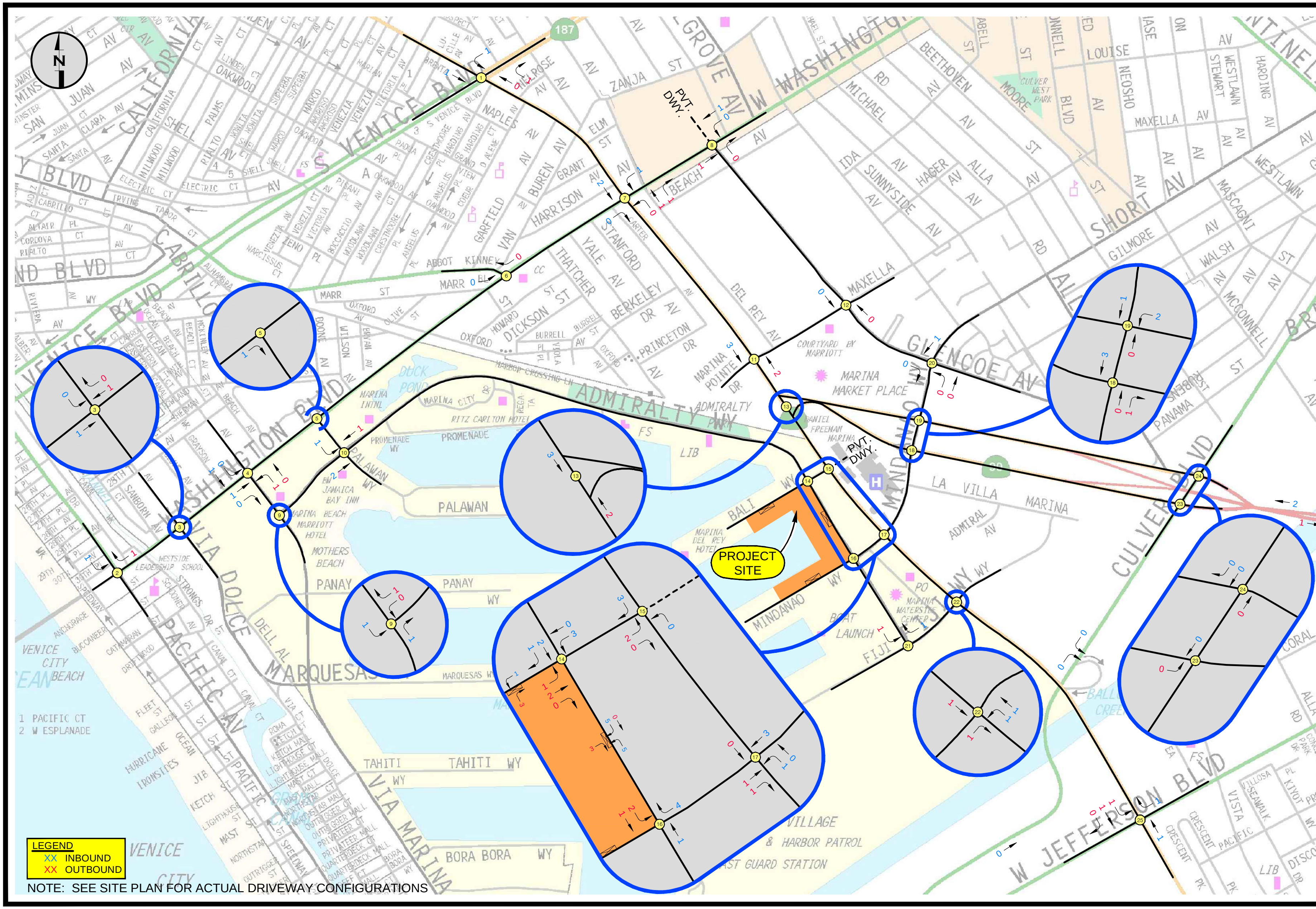



FIGURE A-2(c)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDINGS V & VI - RETAIL & RESTAURANT)
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

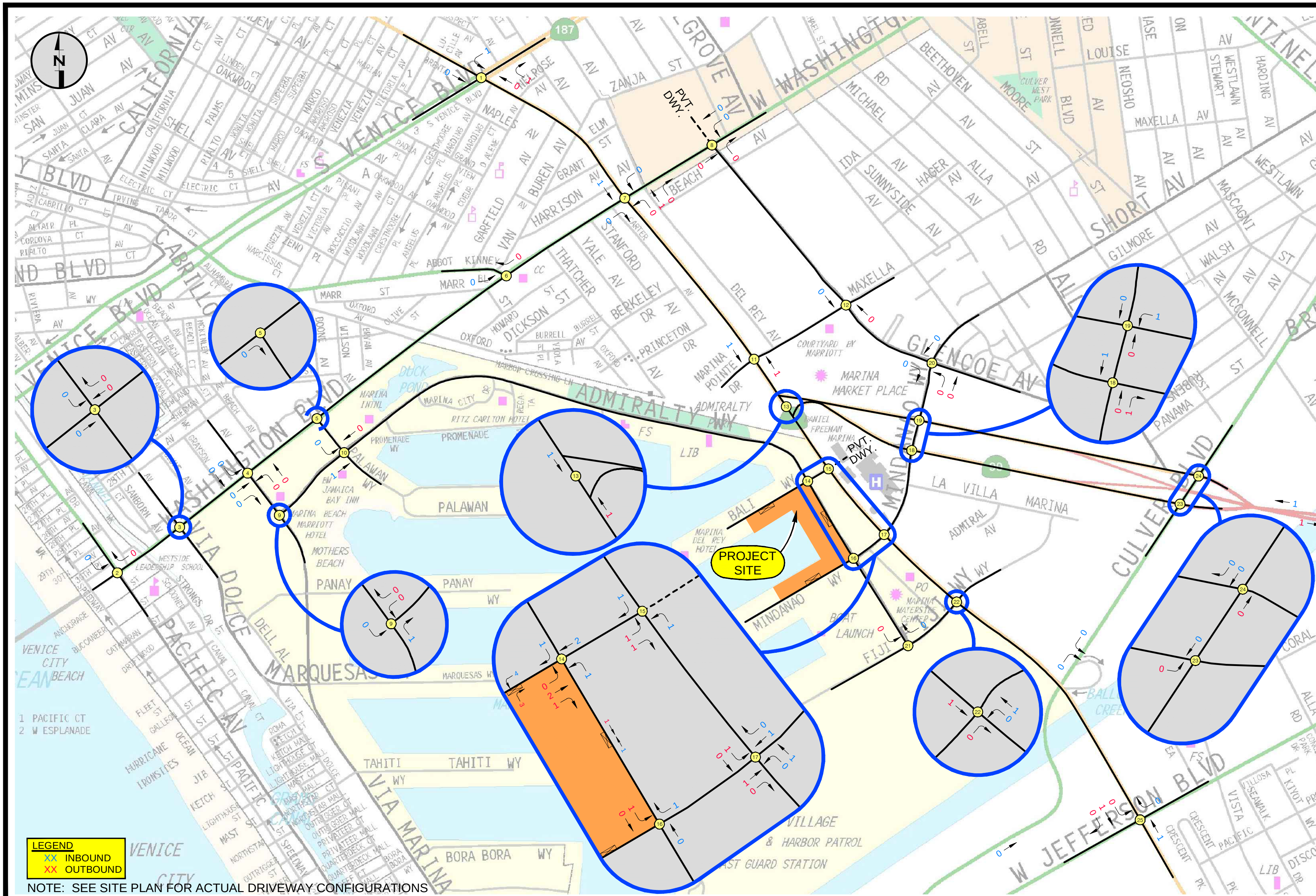



FIGURE A-2(d)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDING VIII - BOAT REPAIR/STORAGE)
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

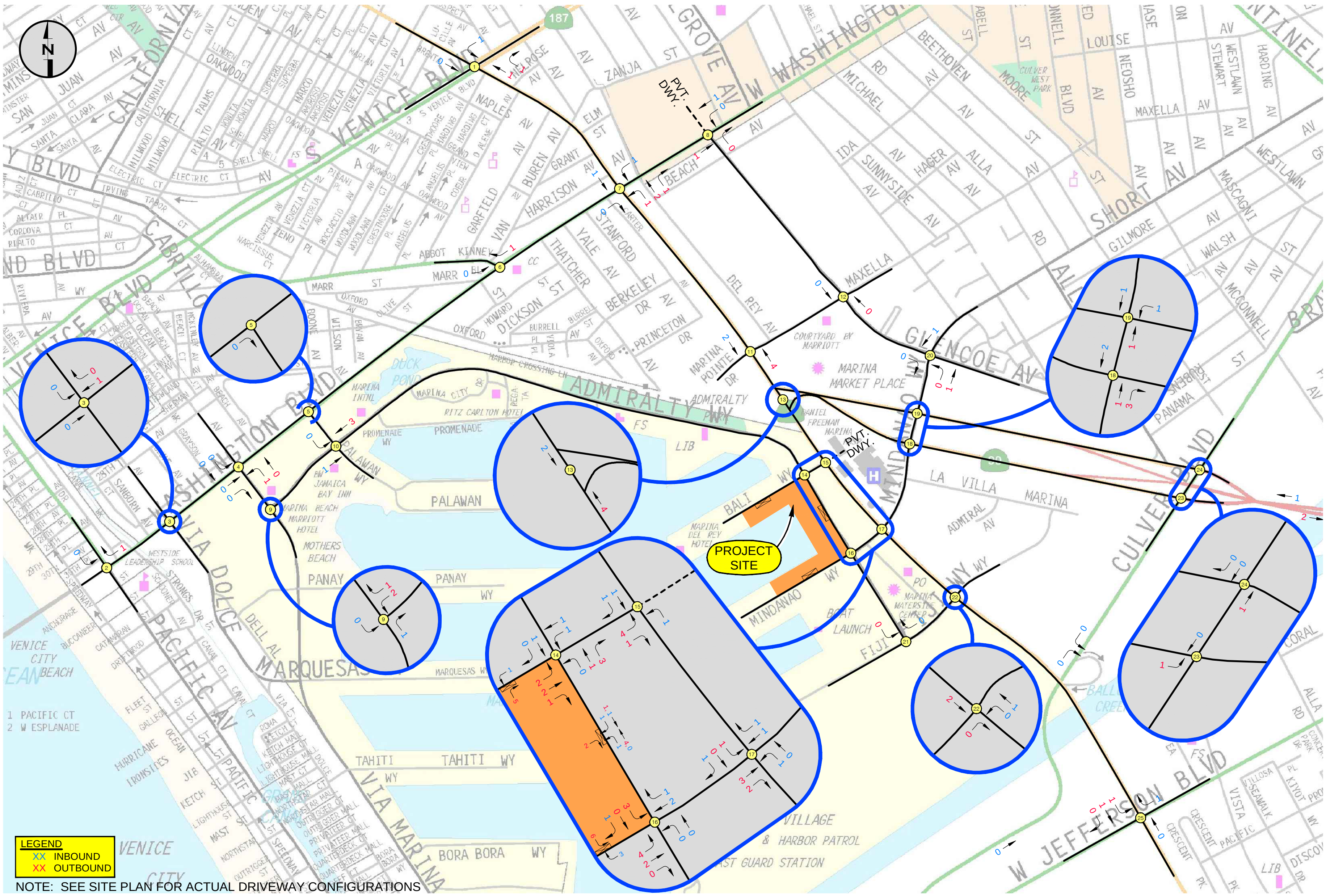



FIGURE A-2(e)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BOAT SLIPS)
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

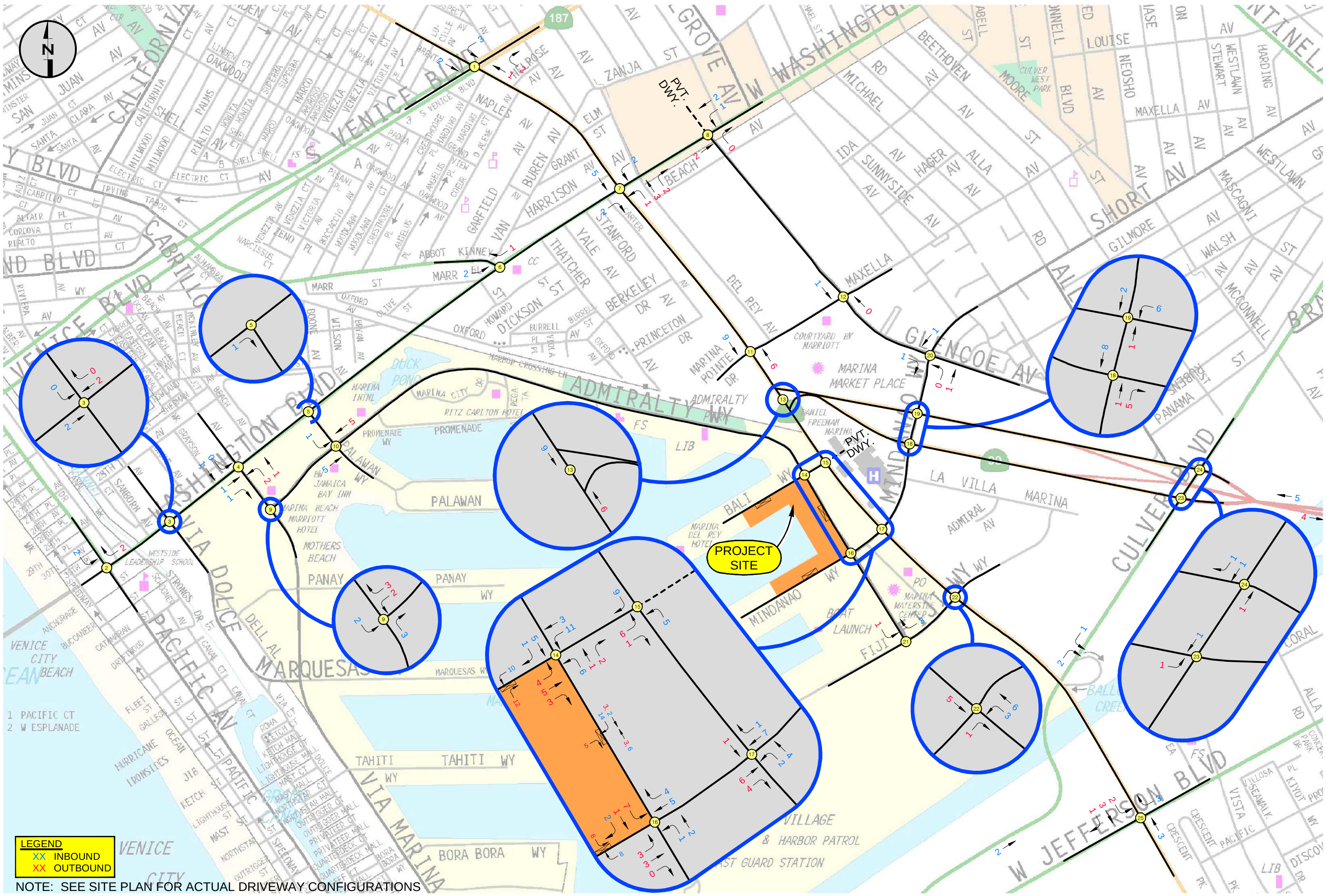



FIGURE A-2(f)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
EXISTING PROJECT SITE USES
AM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

**PM Peak Hour**

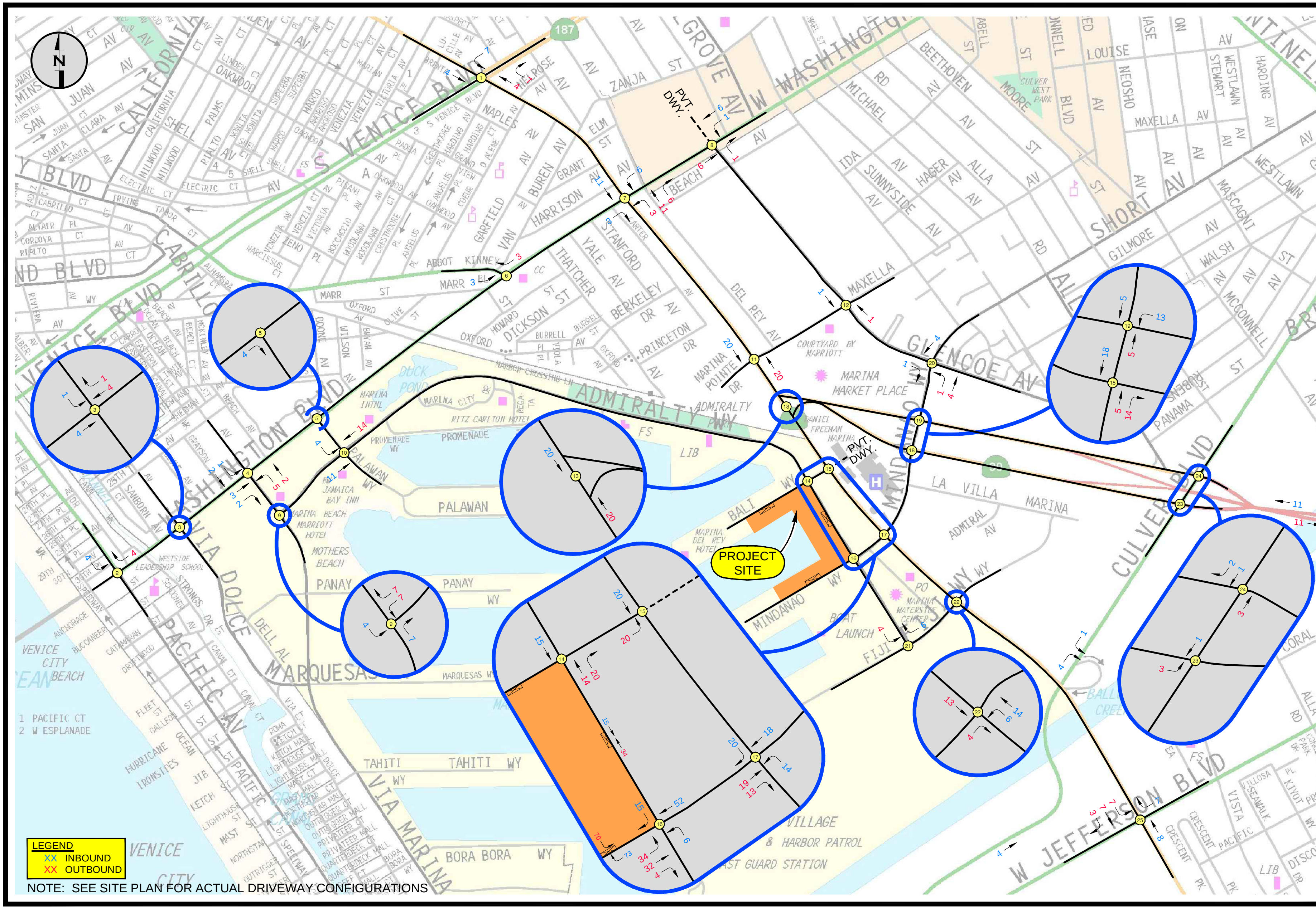



FIGURE A-3(a)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDING II - TRADER JOES)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

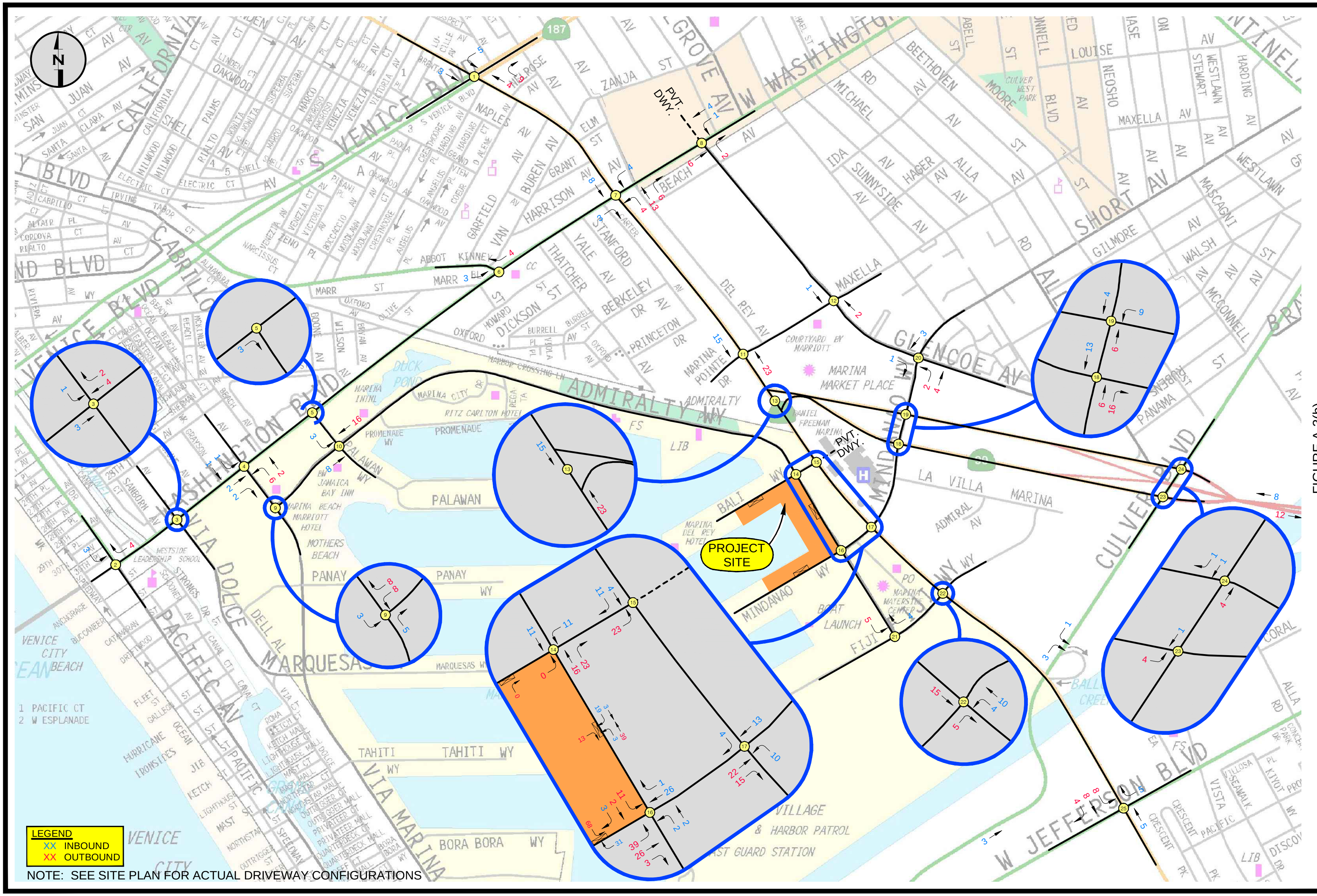



FIGURE A-3(b)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDING IV - WEST MARINE)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

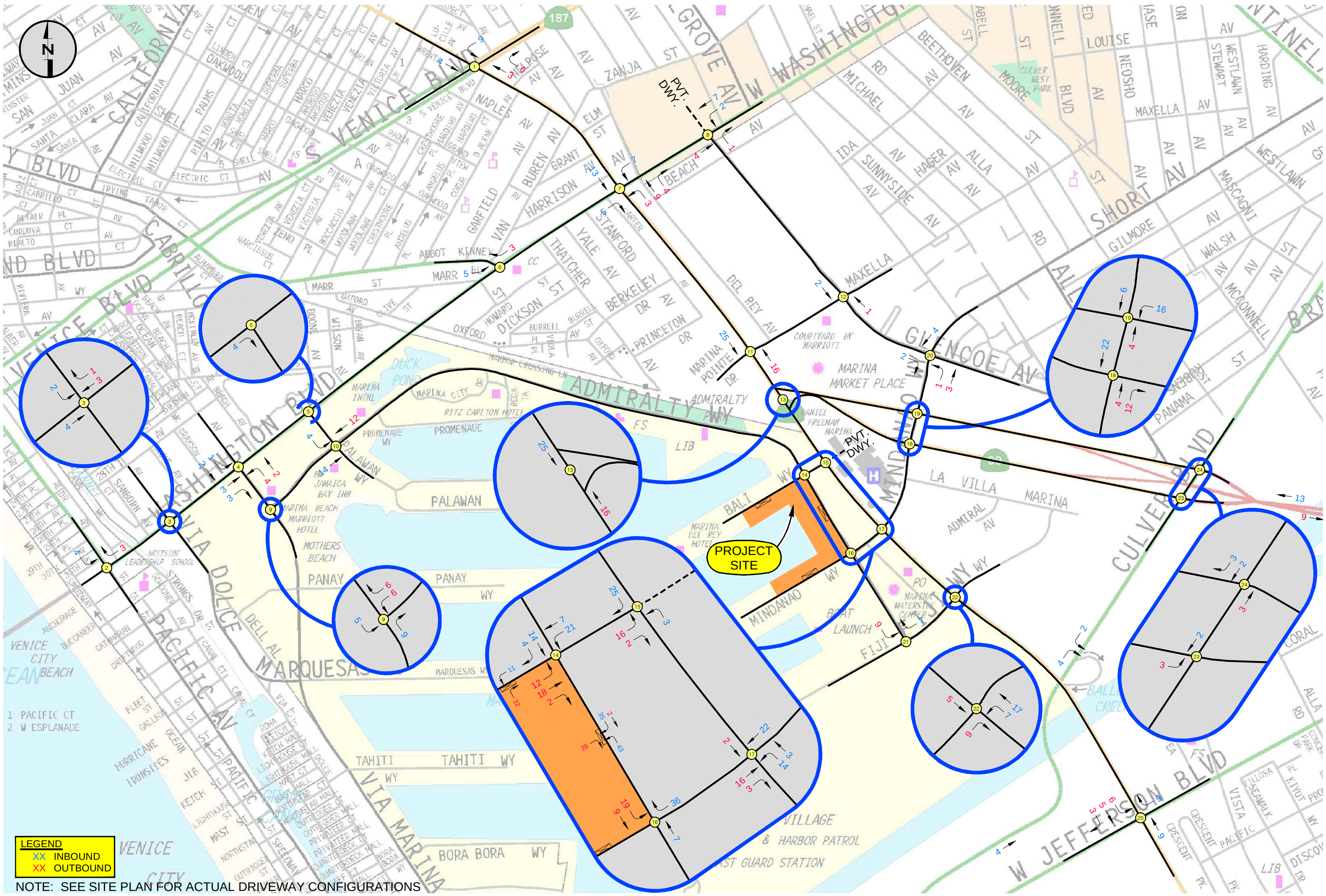



FIGURE A-3(c)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDINGS V & VI - RETAIL & RESTAURANT)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

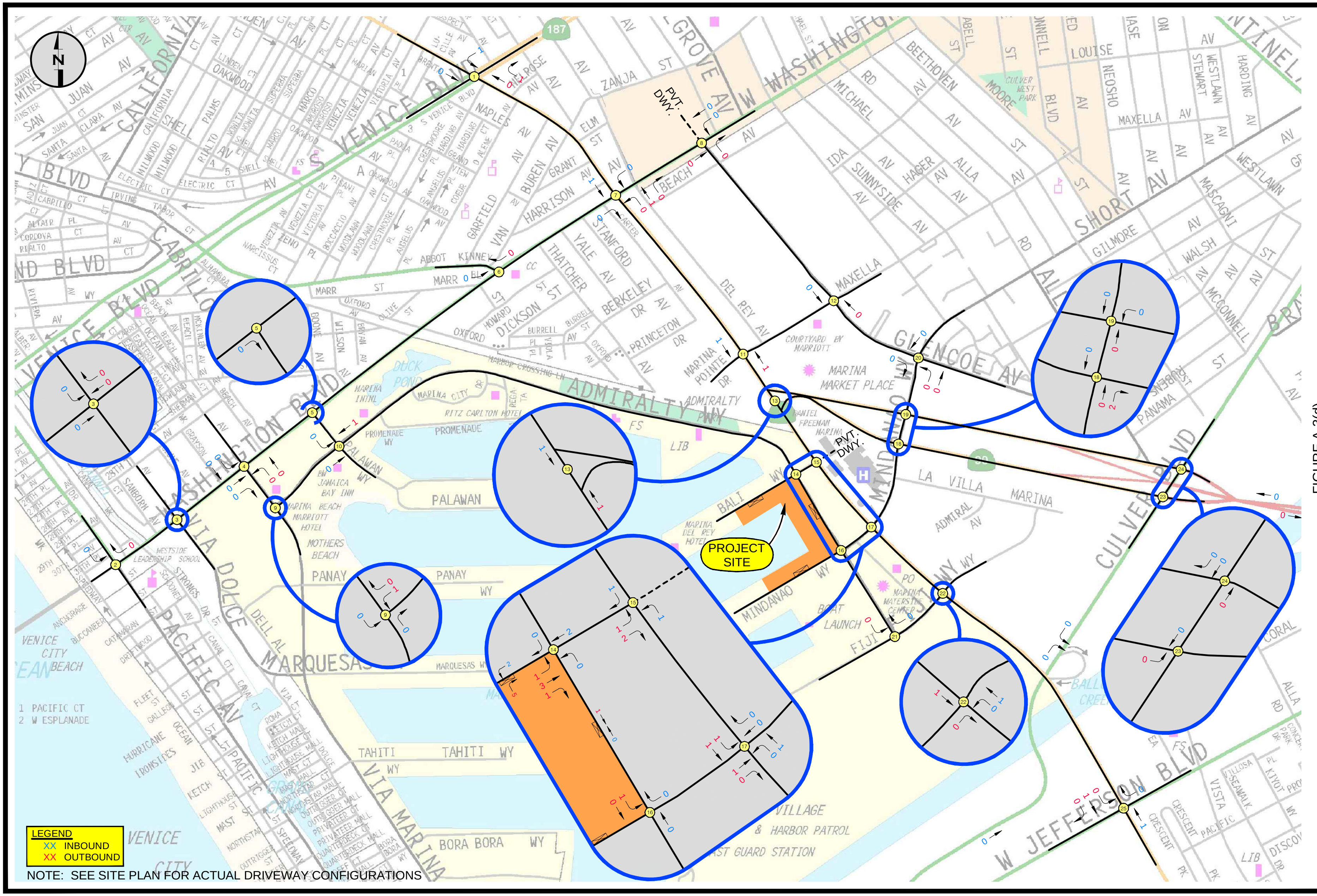



FIGURE A-3(d)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BUILDING VIII - BOAT REPAIR/STORAGE)
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

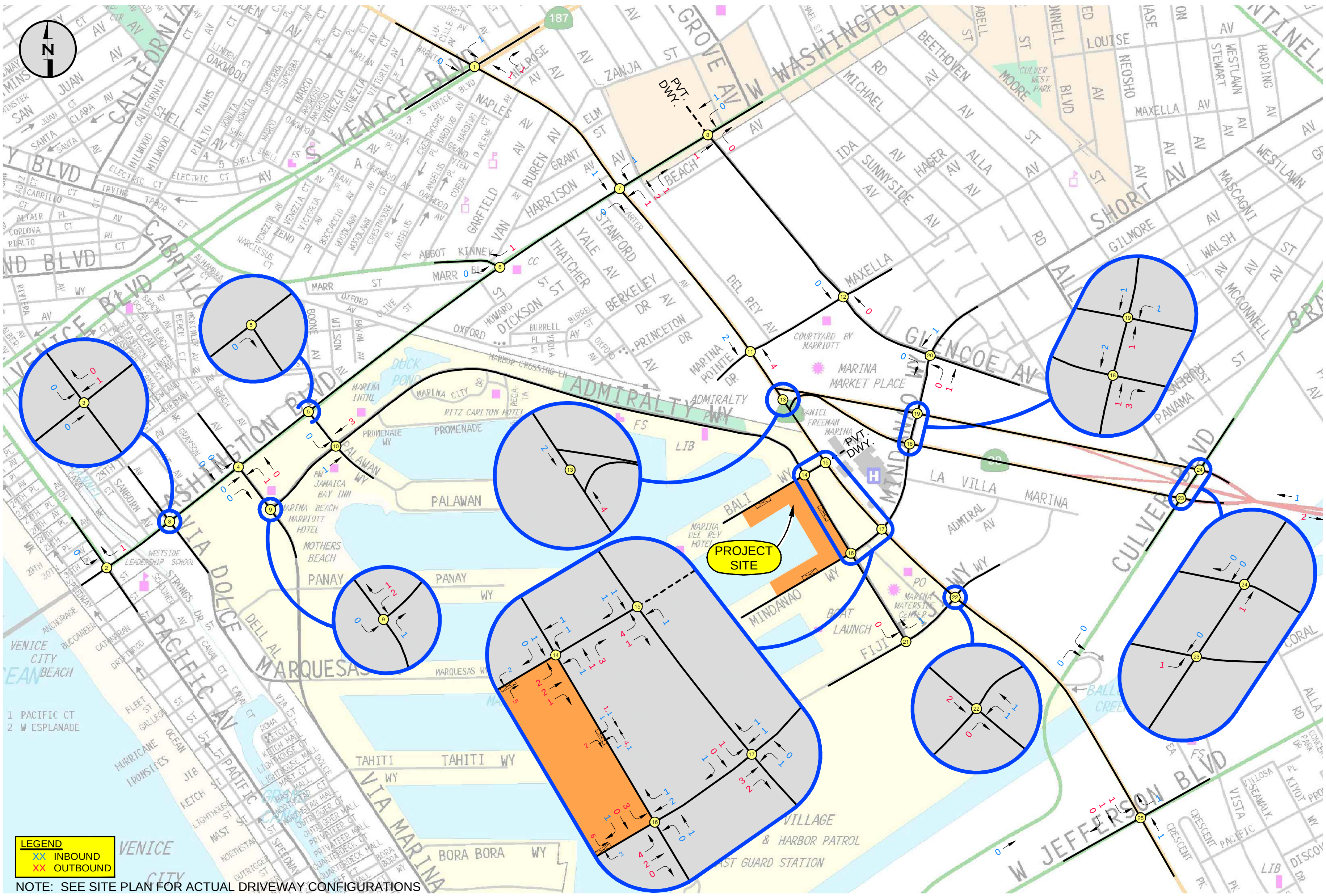



FIGURE A-3(e)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
PROPOSED PROJECT USES (BOAT SLIPS)
PM PEAK HOUR

Hirsch/Green Transportation Consulting, Inc.

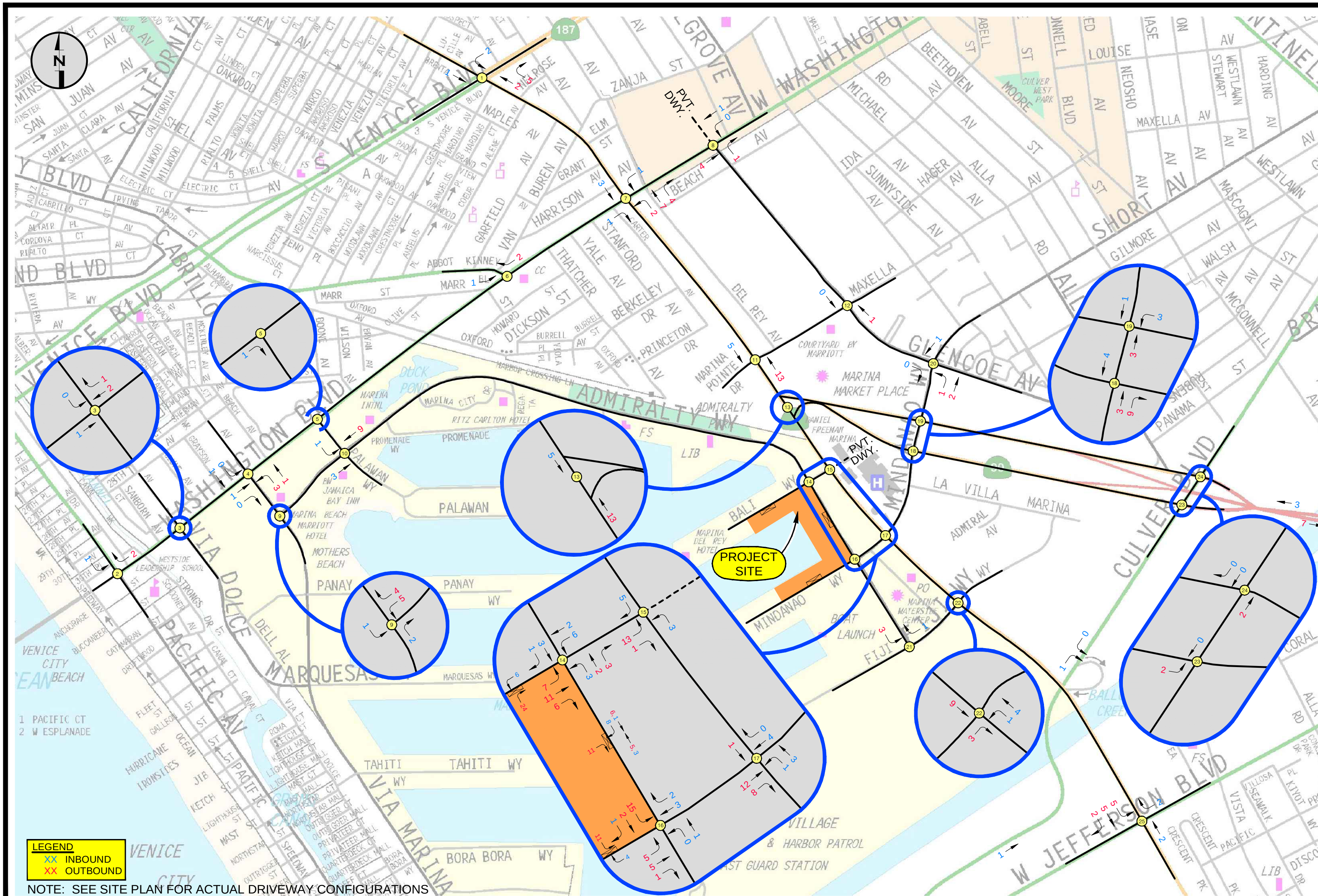



FIGURE A-3(f)

PARCEL 44
NET PROJECT TRAFFIC VOLUMES
EXISTING PROJECT SITE USES
PM PEAK HOUR

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

**Total Project AM and PM Peak Hour Trips at Study Intersections**

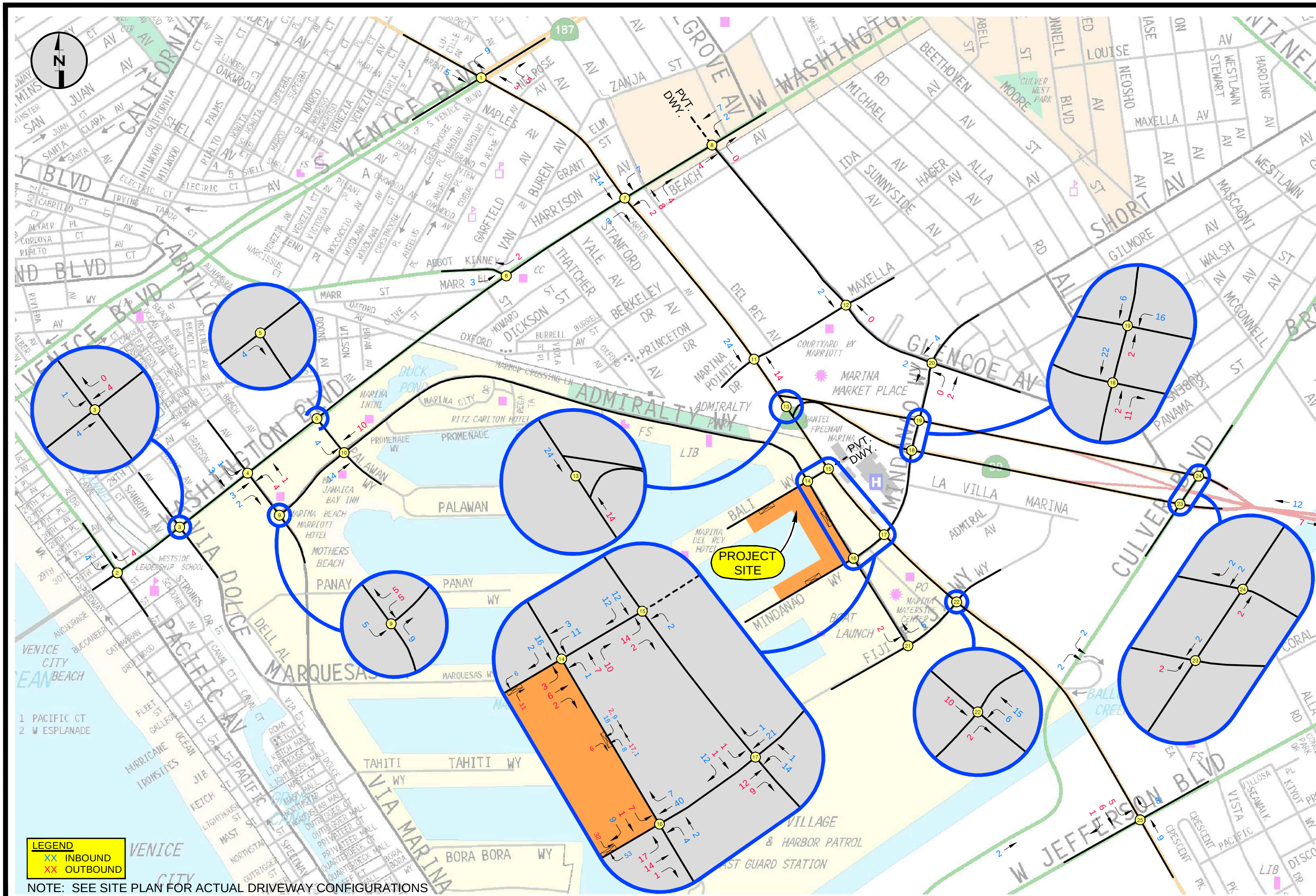



FIGURE A-4(a)

PARCEL 44
TOTAL NET PROJECT TRAFFIC VOLUMES *
AM PEAK HOUR

* DOES NOT INCLUDE REMOVAL OF EXISTING USE TRIPS

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

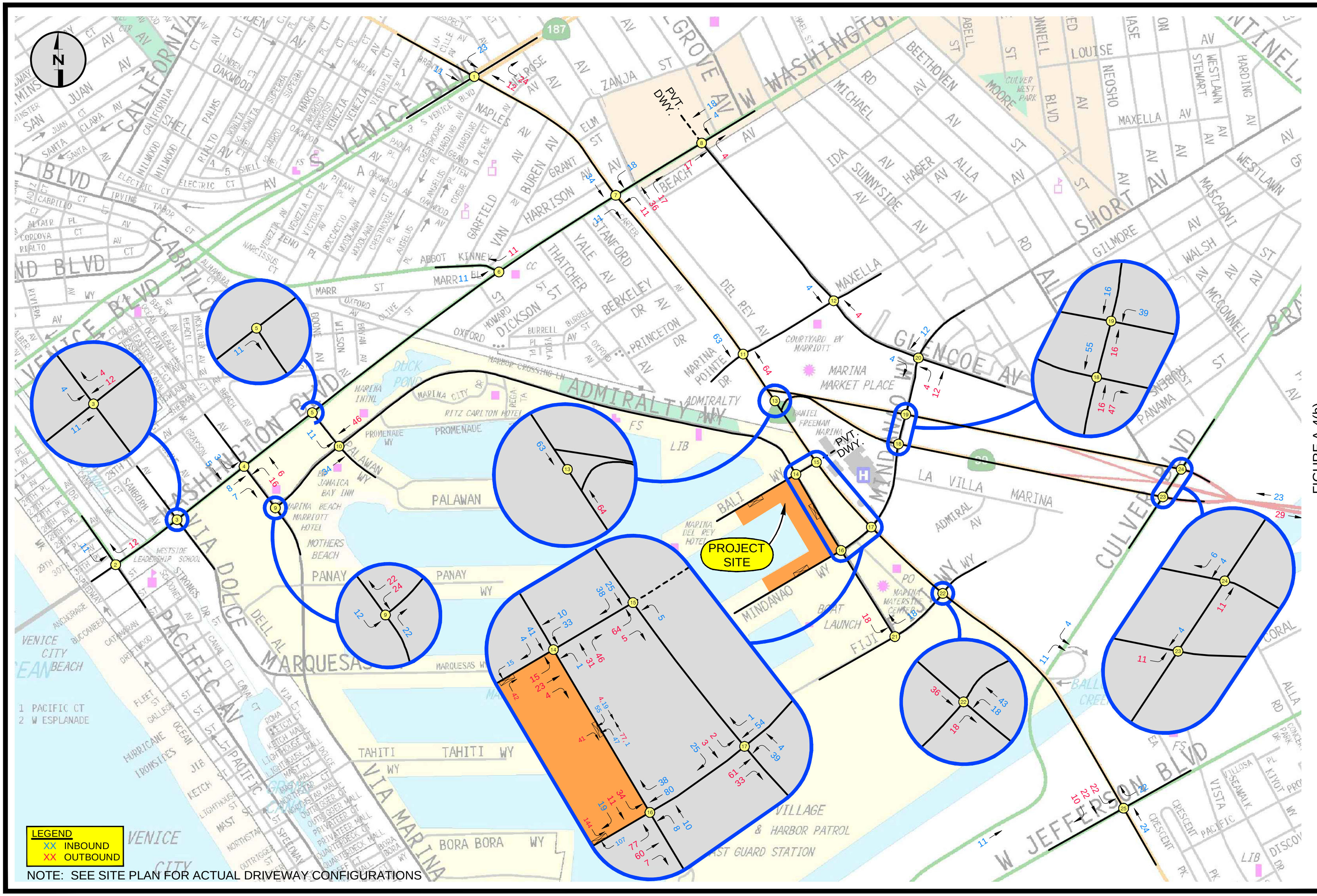



FIGURE A-4(b)

PARCEL 44
TOTAL NET PROJECT TRAFFIC VOLUMES *
PM PEAK HOUR

* DOES NOT INCLUDE REMOVAL OF EXISTING USE TRIPS

Hirsch/Green Transportation Consulting, Inc.

# APPENDIX B

# PROPOSED PARCEL 44 PROJECT SHARED PARKING ANALYSIS

The shared parking evaluations for the proposed project utilize the assumptions and analysis methodologies identified in the 2nd Edition of the Urban Land Institute's *Shared Parking* manual[6]. This document provides parking accumulation profiles (hourly parking use percentages) for a variety of land uses, including the retail (including the supermarket), restaurant, and office uses proposed to occupy the new Parcel 44 project. Note, however, that the ULI data does not include parking accumulation profiles for the project's proposed "community room", "yacht club", "boat slips", or "boat storage" uses. For purposes of this study, the parking accumulation curves for the community room use were estimated based on the anticipated usage of that facility, while the remaining uses (yacht club, boat slips, and boat storage) were assumed to exhibit parking demands similar to retail employee demands. The parking accumulation curves used in this analysis are shown in Table B-1, which is provided at the end of this appendix.

The ULI parking accumulation curves identify the amount of parking typically utilized by each of the various land uses during typical hours of operation (generally between about 6:00 AM and 12:00 midnight) as a percentage of the maximum (100 percent) parking demand for each use. The ULI parking accumulation profiles also distinguish between the parking demands for both visitors/patrons and for employees for the various uses. However, the County's Zoning Code parking ratios intrinsically include parking for both visitors and employees, and as such, provide only a single, total parking requirement ratio. Therefore, again for purposes of this assessment, the County's parking requirement ratios were separated into "visitor/patron" and "employee" parking categories using the ratio between the parking demands for each use identified in the ULI *Shared Parking* publication (Table 2-2 of that document). Based on these assumptions, the parking demands for each of the various project component uses were estimated, and are shown in Tables B-2(a) and B-2(b) (for weekday and weekend conditions, respectively).

As shown in these tables, the total baseline weekday parking demands for the proposed project (which are used to identify the maximum, 100 percent parking demands for the site) are the same (484 spaces) as identified previously in Table 4 of this report, although the anticipated weekend parking demands are expected to be somewhat lower (447 spaces), due to the reduced use of the proposed project's "office" components. However, the baseline parking calculations shown in Tables B-2(a) and B-2(b) also include adjustments in the parking demands for several of the project's uses (including the proposed general retail, supermarket, restaurant, and office uses) to account for transit utilization by their employees, which will

[6] *Shared Parking, Second Edition*, Urban Land Institute, Washington, D.C., 2005.

reduce the overall parking demands for the subject uses; these adjustments are considered to be appropriate considering the reductions in vehicular parking requirements allowed by the County associated with the provision of on-site bicycle parking spaces in excess of that otherwise required by the Zoning Code (which include requirements based on proximity of public transit services to the project site), as described earlier in this report. Additionally, slight reductions in the maximum parking demands for the boat slip and boat storage uses were also applied, since it is anticipated that there will be some (albeit, minor) “internal interaction” between these uses and other on-site retail or office uses (including the proposed yacht club). Overall, these transit utilization and/or internal interaction activities are expected to reduce the proposed project’s weekday peak parking demand by about 2.7 percent (to about 471 spaces), while the weekend peak project parking demands would be reduced by about 2.9 percent (to a total of approximately 434 spaces). Finally, the ULI parking accumulation curves for each of the various uses were then applied to these adjusted County Zoning Code parking requirements (which as noted earlier, are assumed to represent the maximum parking demand for each use), in order to identify the hourly parking needs for each of the various uses, for both typical weekday and weekend conditions.

It is of note that despite the relatively nominal reductions in the proposed project’s baseline parking demand calculations described above, the values shown in Tables B-2(a) and B-2(b) are still considered to be conservative. The ULI Shared Parking methodology also allows for the consideration of seasonal variation in site activity, and its associated effects on the parking demands for various uses. Surveys of the developments included in the ULI publication indicate that different land uses experience variations in activity levels depending on the time of year; for instance, typical retail uses show their peak activity during the late year holiday shopping season; shopping activity is generally reduced during the summer months as compared to the winter holiday season. Conversely, restaurant patronage peaks during the summer months as compared to reduced activity levels during the winter months.

However, in order to provide the most conservative analysis of the project’s potential parking needs, and further due to the unique conditions throughout the Southern California region and in Marina del Rey specifically, the seasonal trends identified in the ULI data were not incorporated into this analysis. This conservative assumption was used to account for the year-round moderate weather and the anticipated utilization of the project (and surrounding area) as a tourist destination during the winter months when restaurant and hotel utilizations are typically less than during the summer. Therefore, the shared parking demand analysis for the project assumed that each of the project's proposed uses would exhibit a 100 percent activity level throughout the year, with no seasonal reductions to their parking utilizations. This methodology thus presents a worst case assessment of potential parking demands for the site.

Further, as briefly noted earlier in this report, the proposed project's overall 484-space vehicular parking supply is divided into several parking areas within the site, to accommodate, to the extent feasible, the parking demands associated with each of the project's individual component uses (or combination of uses within the various buildings) in locations adjacent to or in close proximity to the intended users. The individual parking areas, shown in Figure B-1, include approximately 109 vehicular parking spaces provided in the site's southwestern parking lot ("Parking Area 1"), located on Mindanao Way west of the Marvin Braude Bike Path and which is anticipated to primarily serve Building II (Trader Joe's or similar specialty market), while approximately 164 vehicular parking spaces (including nine of the 34 tandem spaces) are located in the parking area at the southeast corner of the project site ("Parking Area 2"), fronting Admiralty Way between Mindanao Way and the project's new Admiralty Way driveway, and which is expected to primarily serve Buildings IV and V (housing West Marine, all of the proposed office space, including the Marine Administration Offices, approximately one-third of the general retail uses, and one of the proposed restaurants). Approximately 94 vehicular parking spaces (including the remaining 25 tandem spaces) are located in the parking area at the northeast corner of the site, fronting Admiralty Way between the new Admiralty Way driveway and Bali Way, with the final approximately 110 vehicular parking spaces provided in the site's northwestern parking lot along Bali Way (west of the Marvin Braude Bike Path); together, these areas (collectively designated as "Parking Area 3") provide a total of approximately 204 vehicular spaces, and are intended to serve Buildings VI and VIII, which house the remaining retail and restaurant uses (Building VI) as well the proposed yacht club, boat repair, and boat dry/mast-up storage (Building VIII). Additionally, it should be noted that each of the three on-site parking areas described in this paragraph will also be utilized for parking for the 148 boat slips (to be developed under previously-approved CDP No. 5-11-131) included in the proposed redevelopment of the Parcel 44 site.

Locating adequate parking near its associated uses reduces the potential for "overparking" of individual parking lot areas within the project site, thereby reducing on-site traffic congestion as well as minimizing the walking distances for project patrons between their parking space and their on-site destination. Therefore, this shared parking analysis was expanded to evaluate not only the anticipated total parking demand for the proposed project, but also the adequacy of each of these individual on-site parking areas in meeting the anticipated parking demands of the anticipated individual component uses, as discussed later in this appendix, and as such, the baseline parking demands for the individual project components and/or groups of uses within the various project buildings is also identified in Tables B-2(a) and B-2(b).

Finally, in order to determine the hourly parking utilizations associated with each of the project's proposed individual uses or groups of uses within each of the new on-site buildings, and to evaluate the effectiveness of the shared parking activity on the overall parking demands for the proposed project (including each of the three individual on-site parking areas described earlier), the hourly parking accumulation curves shown in Table B-1 were applied to the corresponding (adjusted) parking demand values shown in Tables B-2(a) and B-2(b). The results of the shared parking analysis are shown for both the typical weekday and weekend conditions in Table B-3.

As indicated in Table B-3, during typical weekday activity at the site, and considering the effects of shared parking on the overall project parking demands, the proposed project is anticipated to exhibit a maximum parking demand of approximately 457 total vehicular spaces, between approximately 1:00 and 2:00 PM, or about 20 spaces fewer than are proposed to be provided. As also shown in Table B-3, during this weekday peak parking demand period, Parking Area 1 is expected to provide adequate parking to meet its anticipated individual parking demand of approximately 92 spaces, which is about 17 spaces less than the 109 spaces provided. Conversely, Parking Area 2 could exhibit a parking shortage of approximately 30 spaces during the weekday peak demand time, with a total of approximately 194 spaces needed compared to the 164 spaces provided. However, as further shown in Table B-1, Parking Area 3 will provide a surplus of approximately 33 vehicular parking spaces, which alone is sufficient to accommodate the 30-space parking deficiency in Parking Area 2 during the peak demand period, although it should also be noted that the 17 surplus parking spaces in Parking Area 1, as described above, can also be used to accommodate some of the Parking Area 2 demands.

In fact, this situation is true for each of the time periods shown in Table B-3 (approximately 10:00 AM to 7:00 PM) during which individual Parking Area 2 could exhibit some level of parking "shortage". It is important to note that the individual parking areas described in this shared parking evaluation, and particularly those along the site's Admiralty Way frontage, although based on the most likely division of parking demands associated with the nearest buildings or individual uses, are in fact, arbitrary distinctions that do not reflect any actual physical obstacles that would prevent patrons parked in one of these individual areas from walking to nearby uses assumed to be served by either of the other identified on-site parking areas. As such, any "excess" parking demands generated from the assumed Parking Area 2 uses could easily park within the two sections of either Parking Area 1 (along Mindanao Way) or Parking Area 2 (at the northeast corner of the project site, or along Bali Way) without experiencing any meaningful reduction in convenience, especially since Building IV (housing West Marine, and which is expected to produce the majority of the Parking Area 2 demands) can be easily accessed by drivers using Parking Area 1 via the new pedestrian promenade along Basin G, while both Building V (assumed in the parking demands for Parking Area 2) and Building VI (assumed to be served by Parking Area 3) each exhibit convenient pedestrian access from the Bali Way parking section of Parking Area 3 also via the new pedestrian promenade along Basin G. Therefore, the potential parking "deficiency" noted for Parking Area 2 during the peak parking demand periods are not expected to result in any significant on-site parking impacts, nor do they reflect any anticipated overall inadequacy in the project's proposed parking supply.

Further, as described earlier in this report, approximately 34 of the project's proposed total of approximately 477 on-site vehicular parking spaces, located within both Parking Area 2 and Parking Area 3, are configured as tandem spaces, leaving approximately 443 "self-park" or "direct access" spaces, or about 14 spaces fewer than the anticipated peak weekday parking demand of approximately 457 spaces shown in Table B-1. As such, during this time period, and in fact, beginning at approximately 12:00 noon and continuing to approximately 2:00 PM, the anticipated parking demand for the proposed project will exceed 443 spaces, and as such, up to about 14 of the 34 tandem spaces will be needed in order to meet these parking needs (although up to approximately 20 of the tandem spaces will still be available during these times). Therefore, tandem spaces would only be needed for a few hours during the typical weekday mid-day period, and as such, it is recommended that any valet or attendant assisted parking required for the proposed project be limited to the peak parking demand time periods between approximately 11:00 AM to 3:00 PM; since as also shown in Table B-3, the project's maximum weekday parking demands for the hours preceding and following the mid-day peak activity levels are not expected to exceed the available 443 self-park spaces (although a "secondary" parking demand peak of approximately 433 spaces occurs between about 6:00 and 7:00 PM), the proposed project is expected to be able to accommodate its parking demands during these times without the use of any of the tandem parking spaces.

Finally, the project's peak parking demands during typical weekend activity is expected to be considerably less than on weekdays, again due to the reduction in parking demand associated with the proposed office uses. As also shown in Table B-3, on typical weekends, the maximum parking demand for the proposed project is expected to be approximately 398 spaces (between approximately 6:00 and 7:00 PM, and therefore, the proposed project's anticipated weekend parking demands can be accommodated without the use of any of the 34 tandem spaces. As a result, no requirement for valet or attendant assisted parking is warranted during weekends.

Therefore, based on the shared parking analyses summarized in Table B-3, the proposed project will provide more than adequate parking to meet its expected maximum parking needs at all times of the day throughout the year, and as such, no parking shortages or "overflow" parking into adjacent commercial or public parking areas or on nearby streets due to on-site parking shortages is anticipated, and no significant parking-related impacts are expected. Additionally, with the exception of the peak demand period on weekdays between approximately 11:00 AM and 3:00 PM, the proposed tandem spaces, located along the site's Admiralty Way frontage or on the north side of Building IV (West Marine), can be "blocked off" during normal operations of the project's tenants, and no valet or attendant assist parking operations will typically be required outside of this approximately four-hour period. As such, when not needed to accommodate the peak parking demands of the project, the tandem parking spaces could be utilized as public parking for special events (such as concerts at nearby Burton Chace Park, or during the annual July $4^{th}$ fireworks show) occurring elsewhere in the Marina.

**Table B-1**
**Parcel 44 Project**
**Shared Parking Demand Calculations**

| | ULI Shared Parking Utilization Curves | | | | | | | | | | | | Estimated Parking Utilization Curves (uses not in ULI data) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Shopping Center (Typ) - includes market | | | | Fine/Casual Dining Restaurant | | | | Office | | | | | | | |
| Time | Weekday | | Weekend | | Weekday | | Weekend | | Weekday | | Weekend | | Community Room | | Boat Slips [1] | |
| of Day | Visitor | Employee | Visitor | Employee | Visitor | Employee | Visitor | Employee | Visitor | Employee | Visitor | Employee | Weekday | Weekend | Weekday | Weekend |
| 6:00 AM | 1% | 10% | 1% | 10% | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 0% | 0% | 10% | 10% |
| 7:00 AM | 5% | 15% | 5% | 15% | 0% | 20% | 0% | 20% | 1% | 30% | 20% | 20% | 10% | 15% | 15% | 15% |
| 8:00 AM | 15% | 40% | 10% | 40% | 0% | 50% | 0% | 30% | 20% | 75% | 60% | 60% | 20% | 30% | 40% | 40% |
| 9:00 AM | 35% | 75% | 30% | 75% | 0% | 75% | 0% | 60% | 60% | 95% | 80% | 80% | 50% | 50% | 75% | 75% |
| 10:00 AM | 65% | 85% | 50% | 85% | 15% | 90% | 0% | 75% | 100% | 100% | 90% | 90% | 70% | 75% | 85% | 85% |
| 11:00 AM | 85% | 95% | 65% | 95% | 40% | 90% | 15% | 75% | 45% | 100% | 100% | 100% | 80% | 85% | 95% | 95% |
| 12:00 PM | 95% | 100% | 80% | 100% | 75% | 90% | 50% | 75% | 15% | 90% | 90% | 90% | 95% | 100% | 100% | 100% |
| 1:00 PM | 100% | 100% | 90% | 100% | 75% | 90% | 55% | 75% | 45% | 90% | 80% | 80% | 95% | 100% | 100% | 100% |
| 2:00 PM | 95% | 100% | 100% | 100% | 65% | 90% | 45% | 75% | 100% | 100% | 60% | 60% | 80% | 100% | 100% | 100% |
| 3:00 PM | 90% | 100% | 100% | 100% | 40% | 75% | 45% | 75% | 45% | 100% | 40% | 40% | 70% | 100% | 100% | 100% |
| 4:00 PM | 90% | 100% | 95% | 100% | 50% | 75% | 45% | 75% | 15% | 90% | 20% | 20% | 80% | 100% | 100% | 100% |
| 5:00 PM | 95% | 95% | 90% | 95% | 75% | 100% | 60% | 100% | 10% | 50% | 10% | 10% | 90% | 100% | 95% | 95% |
| 6:00 PM | 95% | 95% | 80% | 85% | 95% | 100% | 90% | 100% | 5% | 25% | 5% | 5% | 100% | 100% | 85% | 95% |
| 7:00 PM | 95% | 95% | 75% | 80% | 100% | 100% | 95% | 100% | 2% | 10% | 0% | 0% | 100% | 60% | 80% | 95% |
| 8:00 PM | 80% | 90% | 65% | 75% | 100% | 100% | 100% | 100% | 1% | 7% | 0% | 0% | 100% | 30% | 75% | 90% |
| 9:00 PM | 50% | 75% | 50% | 65% | 100% | 100% | 90% | 100% | 0% | 3% | 0% | 0% | 70% | 10% | 65% | 75% |
| 10:00 PM | 30% | 40% | 35% | 45% | 95% | 100% | 90% | 100% | 0% | 1% | 0% | 0% | 25% | 0% | 45% | 40% |
| 11:00 PM | 10% | 15% | 15% | 15% | 75% | 85% | 90% | 85% | 0% | 0% | 0% | 0% | 0% | 0% | 15% | 15% |
| 12:00 AM | 0% | 0% | 0% | 0% | 25% | 35% | 50% | 50% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Note:

[1] Utilization curves also used for "Yacht Club" and "Boat Storage" facilities

**Table B-2(a)**
**Parcel 44 Project - Marina del Rey**
**Shared Parking Demand Calculations**
**Weekday Conditions**

| Proposed Use/Size | LACo Parking Requirement Ratio | Spaces Required | Internal Capture Factor | Transit Use Factor | "Walk In" Factor | Monthly Use Factor | Adjusted Parking Demand |
|---|---|---|---|---|---|---|---|
| **Parking Area 1 - Buildings I & II** | | | | | | | |
| 386 sq. ft. Boater Bathroom | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| 13,625 sq. ft. Trader Joe's | | | | | | | |
| Visitor | 3.22 / 1,000 sq. ft. | 44 | 0% | 0% | 0% | 100% | 44 |
| Employee | 0.78 / 1,000 sq. ft. | 11 | 0% | 10% | 0% | 100% | 10 |
| | 4.00 / 1,000 sq. ft. | 55 | | | | | 54 |
| **Parking Area 2 - Buildings III, IV & V** | | | | | | | |
| 386 sq. ft. Boater Bathroom | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| 29,295 sq. ft. Retail (total) [1] | | | | | | | |
| Visitor | 3.22 / 1,000 sq. ft. | 94 | 0% | 0% | 0% | 100% | 94 |
| Employee | 0.78 / 1,000 sq. ft. | 23 | 0% | 10% | 0% | 100% | 21 |
| | 4.00 / 1,000 sq. ft. | 117 | | | | | 115 |
| 16,588 sq. ft. Offices (total) [2] | | | | | | | |
| Visitor | 0.20 / 1,000 sq. ft. | 3 | 0% | 0% | 0% | 100% | 3 |
| Employee | 2.30 / 1,000 sq. ft. | 38 | 0% | 5% | 0% | 100% | 36 |
| | 2.50 / 1,000 sq. ft. | 41 | | | | | 39 |
| 840 sq. ft. Community Room | 4.00 / 1,000 sq. ft. | 3 | 0% | 0% | 0% | 100% | 3 |
| 2,355 sq. ft. "Greenleaf" Restaurant (67 indoor and 15 outdoor seats) | | | | | | | |
| Visitor | 1.00 / 3 seats | 27 | 0% | 0% | 0% | 100% | 27 |
| Employee | 1.00 / 600 sq. ft. * | 2 | 0% | 10% | 0% | 100% | 2 |
| | | 29 | | | | | 29 |
| 542 sq. ft. Boater Laundry | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| **Parking Area 3 - Buildings VI, VII & VIII** | | | | | | | |
| 10,200 sq. ft. Retail (total) [3] | | | | | | | |
| Visitor | 3.22 / 1,000 sq. ft. | 33 | 0% | 0% | 0% | 100% | 33 |
| Employee | 0.78 / 1,000 sq. ft. | 8 | 0% | 10% | 0% | 100% | 7 |
| | 4.00 / 1,000 sq. ft. | 41 | | | | | 40 |
| 7,500 sq. ft. "Tin Roof" Restaurant (200 indoor and 100 outdoor seats) | | | | | | | |
| Visitor | 1.00 / 3 seats | 100 | 0% | 0% | 0% | 100% | 100 |
| Employee | 1.00 / 600 sq. ft. * | 8 | 0% | 10% | 0% | 100% | 7 |
| | | 108 | | | | | 107 |
| 1,150 sq. ft. Yacht Club | 4.00 / 1,000 sq. ft. | 5 | 0% | 0% | 0% | 100% | 5 |
| 69 -boat Boat Storage | 0.30 / boat space | 21 | 10% | 0% | 0% | 100% | 19 |
| 386 sq. ft. Boater Bathroom | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| **General On-Site Parking (spread throughout Parking Areas 1, 2, and 3)** | | | | | | | |
| 148 -boat Boat Slips | 0.60 / boat space | 89 | 5% | 0% | 0% | 100% | 85 |
| 83,253 sq. ft. Total Project | | 509 | **Total Baseline Parking Requirements** | | | | **496** |
| Less Parking Reduction for Provision of Bicycle Parking | | (25) | | | | | **(25)** |
| (to maximum 5% total vehicular parking reduction, or 25 spaces; replaced at 2 bicycle spaces for each vehicular space removed, replacement bicycle spaces in addition to 26 required bicycle spaces) | | 484 | **Total Adjusted Parking Requirements** | | | | **471** |

Notes:

[1] Includes 25,000 sq. ft. West Marine; 3,795 sq. ft. general retail (Space "Q"); 500 sq. ft. "Greenleaf" market (Space Q-2)

[2] Includes 2,285 sq. ft. Marine Admin. Offices (Space N-2); 5,133 sq. ft. Boat Brokers Offices (Spaces L and N-3); 9,170 sq. ft. General Offices (Spaces N-1, N-4, and N-5)

**Table B-2(b)**
**Parcel 44 Project - Marina del Rey**
**Shared Parking Demand Calculations**
**Weekend Conditions**

| Proposed Use/Size | LACo Parking Requirement Ratio | Spaces Required | Internal Capture Factor | Transit Use Factor | "Walk In" Factor | Monthly Use Factor | Adjusted Parking Demand |
|---|---|---|---|---|---|---|---|
| **Parking Area 1 - Buildings I & II** | | | | | | | |
| 386 sq. ft. Boater Bathroom | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| 13,625 sq. ft. Trader Joe's | | | | | | | |
| Visitor | 3.20 / 1,000 sq. ft. | 44 | 0% | 0% | 0% | 100% | 44 |
| Employee | 0.80 / 1,000 sq. ft. | 11 | 0% | 10% | 0% | 100% | 10 |
| | 4.00 / 1,000 sq. ft. | 55 | | | | | 54 |
| **Parking Area 2 - Buildings III, IV & V** | | | | | | | |
| 386 sq. ft. Boater Bathroom | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| 29,295 sq. ft. Retail (total) [1] | | | | | | | |
| Visitor | 3.20 / 1,000 sq. ft. | 94 | 0% | 0% | 0% | 100% | 94 |
| Employee | 0.80 / 1,000 sq. ft. | 23 | 0% | 10% | 0% | 100% | 21 |
| | 4.00 / 1,000 sq. ft. | 117 | | | | | 115 |
| 16,588 sq. ft. Offices (total) [2] | | | | | | | |
| Visitor | 0.02 / 1,000 sq. ft. | 0 | 0% | 0% | 5% | 100% | 0 |
| Employee | 0.23 / 1,000 sq. ft. | 4 | 0% | 5% | 0% | 100% | 4 |
| | 0.25 / 1,000 sq. ft. | 4 | | | | | 4 |
| 840 sq. ft. Community Room | 4.00 / 1,000 sq. ft. | 3 | 0% | 0% | 0% | 100% | 3 |
| 2,355 sq. ft. "Greenleaf" Restaurant (67 indoor and 15 outdoor seats) | | | | | | | |
| Visitor | 1.00 / 3 seats | 27 | 0% | 0% | 0% | 100% | 27 |
| Employee | 1.00 / 600 sq. ft. * | 2 | 0% | 10% | 0% | 100% | 2 |
| | | 29 | | | | | 29 |
| 542 sq. ft. Boater Laundry | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| **Parking Area 3 - Buildings VI, VII & VIII** | | | | | | | |
| 10,200 sq. ft. Retail (total) [3] | | | | | | | |
| Visitor | 3.20 / 1,000 sq. ft. | 33 | 0% | 0% | 5% | 100% | 31 |
| Employee | 0.80 / 1,000 sq. ft. | 8 | 0% | 10% | 0% | 100% | 7 |
| | 4.00 / 1,000 sq. ft. | 41 | | | | | 38 |
| 7,500 sq. ft. "Tin Roof" Restaurant (200 indoor and 100 outdoor seats) | | | | | | | |
| Visitor | 1.00 / 3 seats | 100 | 0% | 0% | 0% | 100% | 100 |
| Employee | 1.00 / 600 sq. ft. * | 8 | 0% | 10% | 0% | 100% | 7 |
| | | 108 | | | | | 107 |
| 1,150 sq. ft. Yacht Club | 4.00 / 1,000 sq. ft. | 5 | 0% | 0% | 0% | 100% | 5 |
| 69 -boat Boat Storage | 0.30 / boat space | 21 | 10% | 0% | 0% | 100% | 19 |
| 386 sq. ft. Boater Bathroom | n/a (ancillary use) | 0 | 0% | 0% | 0% | 100% | 0 |
| **General On-Site Parking (spread throughout Parking Areas 1, 2, and 3)** | | | | | | | |
| 148 -boat Boat Slips | 0.60 / boat space | 89 | 5% | 0% | 0% | 100% | 85 |
| 83,253 sq. ft. Total Project | | 472 | **Total Baseline Parking Requirements** | | | | **459** |
| Less Parking Reduction for Provision of Bicycle Parking | | (25) | | | | | **(25)** |
| (to maximum 5% total vehicular parking reduction, or 25 spaces; replaced at 2 bicycle spaces for each vehicular space removed, replacement bicycle spaces in addition to 26 required bicycle spaces) | | 447 | **Total Adjusted Parking Requirements** | | | | **434** |

Notes:

[1] Includes 25,000 sq. ft. West Marine; 3,795 sq. ft. general retail (Space "Q"); 500 sq. ft. "Greenleaf" market (Space Q-2)

[2] Includes 2,285 sq. ft. Marine Admin. Offices (Space N-2); 5,133 sq. ft. Boat Brokers Offices (Spaces L and N-3); 9,170 sq. ft. General Offices (Spaces N-1, N-4, and N-5)


FIGURE B-1

PARCEL 44
"INDIVIDUAL" ON-SITE VEHICULAR PARKING AREAS

Hirsch/Green Transportation Consulting, Inc.

**Table B-3**
**Parcel 44 Project**
**Shared Parking Demand Calculations**

**Parking Demand Calculations - Weekday Conditions**

Hourly Parking Demands by Project Component

| Hour Beginning | Parking Area 1 (Buildings I & II) | | | | | | | Parking Area 2 (Buildings III, IV & V) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trader Joe's | | | (45%) Boat Slips | Total Parking Demand | Area 1 Parking Provided | Surplus/ (Deficit) | Retail | | | Office | | | "Greenleaf" Restaurant | | | Community Room | (25%) Boat Slips | Total Parking Demand | Area 2 Parking Provided | Surplus/ (Deficit) |
| | Visitor | Employee | Total | | | | | Visitor | Employee | Total | Visitor | Employee | Total | Visitor | Employee | Total | | | | | |
| 6:00 AM | 0 | 1 | 1 | 4 | 5 | 109 | 104 | 1 | 2 | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 6 | 164 | 158 |
| 7:00 AM | 2 | 2 | 4 | 6 | 10 | | 99 | 5 | 3 | 8 | 0 | 11 | 11 | 0 | 0 | 0 | 0 | 3 | 22 | | 142 |
| 8:00 AM | 7 | 4 | 11 | 15 | 26 | | 83 | 14 | 8 | 22 | 1 | 27 | 28 | 0 | 1 | 1 | 1 | 8 | 60 | | 104 |
| 9:00 AM | 15 | 8 | 23 | 29 | 52 | | 57 | 33 | 16 | 49 | 2 | 34 | 36 | 0 | 2 | 2 | 2 | 16 | 105 | | 59 |
| 10:00 AM | 29 | 9 | 38 | 32 | 70 | | 39 | 61 | 18 | 79 | 3 | 36 | 39 | 4 | 2 | 6 | 2 | 18 | 144 | | 20 |
| 11:00 AM | 37 | 10 | 47 | 36 | 83 | | 26 | 80 | 20 | 100 | 1 | 36 | 37 | 11 | 2 | 13 | 2 | 20 | 172 | | (8) |
| 12:00 PM | 42 | 10 | 52 | 38 | 90 | | 19 | 89 | 21 | 110 | 0 | 32 | 32 | 20 | 2 | 22 | 3 | 21 | 188 | | (24) |
| 1:00 PM | 44 | 10 | 54 | 38 | 92 | | 17 | 94 | 21 | 115 | 1 | 32 | 33 | 20 | 2 | 22 | 3 | 21 | 194 | | (30) |
| 2:00 PM | 42 | 10 | 52 | 38 | 90 | | 19 | 89 | 21 | 110 | 3 | 36 | 39 | 18 | 2 | 20 | 2 | 21 | 192 | | (28) |
| 3:00 PM | 40 | 10 | 50 | 38 | 88 | | 21 | 85 | 21 | 106 | 1 | 36 | 37 | 11 | 2 | 13 | 2 | 21 | 179 | | (15) |
| 4:00 PM | 40 | 10 | 50 | 38 | 88 | | 21 | 85 | 21 | 106 | 0 | 32 | 32 | 14 | 2 | 16 | 2 | 21 | 177 | | (13) |
| 5:00 PM | 42 | 10 | 52 | 36 | 88 | | 21 | 89 | 20 | 109 | 0 | 18 | 18 | 20 | 2 | 22 | 3 | 20 | 172 | | (8) |
| 6:00 PM | 42 | 10 | 52 | 32 | 84 | | 25 | 89 | 20 | 109 | 0 | 9 | 9 | 26 | 2 | 28 | 3 | 18 | 167 | | (3) |
| 7:00 PM | 42 | 10 | 52 | 30 | 82 | | 27 | 89 | 20 | 109 | 0 | 4 | 4 | 27 | 2 | 29 | 3 | 17 | 162 | | 2 |
| 8:00 PM | 35 | 9 | 44 | 29 | 73 | | 36 | 75 | 19 | 94 | 0 | 3 | 3 | 27 | 2 | 29 | 3 | 16 | 145 | | 19 |
| 9:00 PM | 22 | 8 | 30 | 25 | 55 | | 54 | 47 | 16 | 63 | 0 | 1 | 1 | 27 | 2 | 29 | 2 | 14 | 109 | | 55 |
| 10:00 PM | 13 | 4 | 17 | 17 | 34 | | 75 | 28 | 8 | 36 | 0 | 0 | 0 | 26 | 2 | 28 | 1 | 9 | 74 | | 90 |
| 11:00 PM | 4 | 2 | 6 | 6 | 12 | | 97 | 9 | 3 | 12 | 0 | 0 | 0 | 20 | 2 | 22 | 0 | 3 | 37 | | 127 |
| 12:00 AM | 0 | 0 | 0 | 0 | 0 | | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 8 | 0 | 0 | 8 | | 156 |

| Hour Beginning | Parking Area 3 (Buildings VI, VII & VIII) | | | | | | | | | | | | | Parcel 44 Project Site Overall Parking Demand | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Retail | | | "Tin Roof" Restaurant | | | Yacht Club | Boat Storage | (30%) Boat Slips | Total Parking Demand | Area 3 Parking Provided | Surplus/ (Deficit) | | Total Parking Demand | Total Spaces Provided | Total Surplus/ (Deficit) |
| | Visitor | Employee | Total | Visitor | Employee | Total | | | | | | | | | | |
| 6:00 AM | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 3 | 7 | 204 | 197 | | 18 | 477 | 459 |
| 7:00 AM | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 3 | 4 | 12 | | 192 | | 44 | | 433 |
| 8:00 AM | 5 | 3 | 8 | 0 | 4 | 4 | 2 | 8 | 10 | 32 | | 172 | | 118 | | 359 |
| 9:00 AM | 12 | 5 | 17 | 0 | 5 | 5 | 4 | 14 | 20 | 60 | | 144 | | 217 | | 260 |
| 10:00 AM | 21 | 6 | 27 | 15 | 6 | 21 | 4 | 16 | 22 | 90 | | 114 | | 304 | | 173 |
| 11:00 AM | 28 | 7 | 35 | 40 | 6 | 46 | 5 | 18 | 25 | 129 | | 75 | | 384 | | 93 |
| 12:00 PM | 31 | 7 | 38 | 75 | 6 | 81 | 5 | 19 | 26 | 169 | | 35 | | 447 | | 30 |
| 1:00 PM | 33 | 7 | 40 | 75 | 6 | 81 | 5 | 19 | 26 | 171 | | 33 | | 457 * | | 20 |
| 2:00 PM | 31 | 7 | 38 | 65 | 6 | 71 | 5 | 19 | 26 | 159 | | 45 | | 441 | | 36 |
| 3:00 PM | 30 | 7 | 37 | 40 | 5 | 45 | 5 | 19 | 26 | 132 | | 72 | | 399 | | 78 |
| 4:00 PM | 30 | 7 | 37 | 50 | 5 | 55 | 5 | 19 | 26 | 142 | | 62 | | 407 | | 70 |
| 5:00 PM | 31 | 7 | 38 | 75 | 7 | 82 | 5 | 18 | 25 | 168 | | 36 | | 428 | | 49 |
| 6:00 PM | 31 | 7 | 38 | 95 | 7 | 102 | 4 | 16 | 22 | 182 | | 22 | | 433 | | 44 |
| 7:00 PM | 31 | 7 | 38 | 100 | 7 | 107 | 4 | 15 | 21 | 185 | | 19 | | 429 | | 48 |
| 8:00 PM | 26 | 6 | 32 | 100 | 7 | 107 | 4 | 14 | 20 | 177 | | 27 | | 395 | | 82 |
| 9:00 PM | 17 | 5 | 22 | 100 | 7 | 107 | 3 | 12 | 17 | 161 | | 43 | | 325 | | 152 |
| 10:00 PM | 10 | 3 | 13 | 95 | 7 | 102 | 2 | 9 | 12 | 138 | | 66 | | 246 | | 231 |
| 11:00 PM | 3 | 1 | 4 | 75 | 6 | 81 | 1 | 3 | 4 | 93 | | 111 | | 142 | | 335 |
| 12:00 AM | 0 | 0 | 0 | 25 | 2 | 27 | 0 | 0 | 0 | 27 | | 177 | | 35 | | 442 |

Note:
* Indicates peak weekday parking demand

**Parking Demand Calculations - Weekend Conditions**

Hourly Parking Demands by Project Component

| Hour Beginning | Parking Area 1 (Buildings I & II) | | | | | | | Parking Area 2 (Buildings III, IV & V) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trader Joe's | | | (45%) Boat Slips | Total Parking Demand | Area 1 Parking Provided | Surplus/ (Deficit) | Retail | | | Office | | | "Greenleaf" Restaurant | | | Community Room | (25%) Boat Slips | Total Parking Demand | Area 2 Parking Provided | Surplus/ (Deficit) |
| | Visitor | Employee | Total | | | | | Visitor | Employee | Total | Visitor | Employee | Total | Visitor | Employee | Total | | | | | |
| 6:00 AM | 0 | 1 | 1 | 4 | 5 | 109 | 104 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 164 | 159 |
| 7:00 AM | 2 | 2 | 4 | 6 | 10 | | 99 | 5 | 3 | 8 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 12 | | 152 |
| 8:00 AM | 4 | 4 | 8 | 15 | 23 | | 86 | 9 | 8 | 17 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 8 | 29 | | 135 |
| 9:00 AM | 13 | 8 | 21 | 29 | 50 | | 59 | 28 | 16 | 44 | 0 | 3 | 3 | 0 | 1 | 1 | 2 | 16 | 66 | | 98 |
| 10:00 AM | 22 | 9 | 31 | 32 | 63 | | 46 | 47 | 18 | 65 | 0 | 4 | 4 | 0 | 2 | 2 | 2 | 18 | 91 | | 73 |
| 11:00 AM | 29 | 10 | 39 | 36 | 75 | | 34 | 61 | 20 | 81 | 0 | 4 | 4 | 4 | 2 | 6 | 3 | 20 | 114 | | 50 |
| 12:00 PM | 35 | 10 | 45 | 38 | 83 | | 26 | 75 | 21 | 96 | 0 | 4 | 4 | 14 | 2 | 16 | 3 | 21 | 140 | | 24 |
| 1:00 PM | 40 | 10 | 50 | 38 | 88 | | 21 | 85 | 21 | 106 | 0 | 3 | 3 | 15 | 2 | 17 | 3 | 21 | 150 | | 14 |
| 2:00 PM | 44 | 10 | 54 | 38 | 92 | | 17 | 94 | 21 | 115 | 0 | 2 | 2 | 12 | 2 | 14 | 3 | 21 | 155 | | 9 |
| 3:00 PM | 44 | 10 | 54 | 38 | 92 | | 17 | 94 | 21 | 115 | 0 | 2 | 2 | 12 | 2 | 14 | 3 | 21 | 155 | | 9 |
| 4:00 PM | 42 | 10 | 52 | 38 | 90 | | 19 | 89 | 21 | 110 | 0 | 1 | 1 | 12 | 2 | 14 | 3 | 21 | 149 | | 15 |
| 5:00 PM | 40 | 10 | 50 | 36 | 86 | | 23 | 85 | 20 | 105 | 0 | 0 | 0 | 16 | 2 | 18 | 3 | 20 | 146 | | 18 |
| 6:00 PM | 35 | 9 | 44 | 36 | 80 | | 29 | 75 | 18 | 93 | 0 | 0 | 0 | 24 | 2 | 26 | 3 | 20 | 142 | | 22 |
| 7:00 PM | 33 | 8 | 41 | 36 | 77 | | 32 | 71 | 17 | 88 | 0 | 0 | 0 | 26 | 2 | 28 | 2 | 20 | 138 | | 26 |
| 8:00 PM | 29 | 8 | 37 | 34 | 71 | | 38 | 61 | 16 | 77 | 0 | 0 | 0 | 27 | 2 | 29 | 1 | 19 | 126 | | 38 |
| 9:00 PM | 22 | 7 | 29 | 29 | 58 | | 51 | 47 | 14 | 61 | 0 | 0 | 0 | 24 | 2 | 26 | 0 | 16 | 103 | | 61 |
| 10:00 PM | 15 | 5 | 20 | 15 | 35 | | 74 | 33 | 9 | 42 | 0 | 0 | 0 | 24 | 2 | 26 | 0 | 8 | 76 | | 88 |
| 11:00 PM | 7 | 2 | 9 | 6 | 15 | | 94 | 14 | 3 | 17 | 0 | 0 | 0 | 24 | 2 | 26 | 0 | 3 | 46 | | 118 |
| 12:00 AM | 0 | 0 | 0 | 0 | 0 | | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 15 | 0 | 0 | 15 | | 149 |

| Hour Beginning | Parking Area 3 (Buildings VI, VII & VIII) | | | | | | | | | | | | | Parcel 44 Project Site Overall Parking Demand | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Retail | | | "Tin Roof" Restaurant | | | Yacht Club | Boat Storage | (30%) Boat Slips | Total Parking Demand | Area 3 Parking Provided | Surplus/ (Deficit) | | Total Parking Demand | Total Spaces Provided | Total Surplus/ (Deficit) |
| | Visitor | Employee | Total | Visitor | Employee | Total | | | | | | | | | | |
| 6:00 AM | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 3 | 7 | 204 | 197 | | 17 | 477 | 460 |
| 7:00 AM | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 3 | 4 | 12 | | 192 | | 34 | | 443 |
| 8:00 AM | 3 | 3 | 6 | 0 | 2 | 2 | 2 | 8 | 10 | 28 | | 176 | | 80 | | 397 |
| 9:00 AM | 9 | 5 | 14 | 0 | 4 | 4 | 4 | 14 | 20 | 56 | | 148 | | 172 | | 305 |
| 10:00 AM | 16 | 6 | 22 | 0 | 5 | 5 | 4 | 16 | 22 | 69 | | 135 | | 223 | | 254 |
| 11:00 AM | 20 | 7 | 27 | 15 | 5 | 20 | 5 | 18 | 25 | 95 | | 109 | | 284 | | 193 |
| 12:00 PM | 25 | 7 | 32 | 50 | 5 | 55 | 5 | 19 | 26 | 137 | | 67 | | 360 | | 117 |
| 1:00 PM | 28 | 7 | 35 | 55 | 5 | 60 | 5 | 19 | 26 | 145 | | 59 | | 383 | | 94 |
| 2:00 PM | 31 | 7 | 38 | 45 | 5 | 50 | 5 | 19 | 26 | 138 | | 66 | | 385 | | 92 |
| 3:00 PM | 31 | 7 | 38 | 45 | 5 | 50 | 5 | 19 | 26 | 138 | | 66 | | 385 | | 92 |
| 4:00 PM | 29 | 7 | 36 | 45 | 5 | 50 | 5 | 19 | 26 | 136 | | 68 | | 375 | | 102 |
| 5:00 PM | 28 | 7 | 35 | 60 | 7 | 67 | 5 | 18 | 25 | 150 | | 54 | | 382 | | 95 |
| 6:00 PM | 25 | 6 | 31 | 90 | 7 | 97 | 5 | 18 | 25 | 176 | | 28 | | 398 * | | 79 |
| 7:00 PM | 23 | 6 | 29 | 95 | 7 | 102 | 5 | 18 | 25 | 179 | | 25 | | 394 | | 83 |
| 8:00 PM | 20 | 5 | 25 | 100 | 7 | 107 | 5 | 17 | 23 | 177 | | 27 | | 374 | | 103 |
| 9:00 PM | 16 | 5 | 21 | 90 | 7 | 97 | 4 | 14 | 20 | 156 | | 48 | | 317 | | 160 |
| 10:00 PM | 11 | 3 | 14 | 90 | 7 | 97 | 2 | 8 | 10 | 131 | | 73 | | 242 | | 235 |
| 11:00 PM | 5 | 1 | 6 | 90 | 6 | 96 | 1 | 3 | 4 | 110 | | 94 | | 171 | | 306 |
| 12:00 AM | 0 | 0 | 0 | 50 | 4 | 54 | 0 | 0 | 0 | 54 | | 150 | | 69 | | 408 |

Note:
* Indicates peak weekend parking demand

## APPENDIX C

## PROJECT ADMIRALTY WAY DRIVEWAY “GAP” STUDY (EXISTING CONDITIONS)

## AND

## FUTURE (2020) SYNCHRO ANALYSIS OF PROJECT ADMIRALTY WAY DRIVEWAY

**(INCLUDING PROGRAMMED LUP IMPROVEMENTS TO INSTALL DUAL SOUTHBOUND LEFT-TURN LANES ON ADMIRALTY WAY AT BOTH BALI WAY AND MINDANAO WAY)**

**Admiralty Way “Gap” Study – Existing (2012) Conditions**

In order to provide additional information regarding the potential operations of the proposed project's Admiralty Way driveway, including any access and/or capacity constraints resulting from existing and/or forecast future traffic volumes and congestion along Admiralty Way or at the site-adjacent intersections of Admiralty Way and Bali Way, and Admiralty Way and Mindanao Way, a detailed examination of the existing traffic flows along Admiralty Way was conducted. This supplemental analysis was used to determine whether northbound left-turn moves into this proposed new project driveway would be possible during the peak commute traffic periods, and if so, whether capacity constraints do or will exist that would limit the amount of traffic entering the driveway during the AM or PM peak commute traffic periods. This examination utilized analysis assumptions and methodologies described in the current Highway Capacity Manual ("HCM"), published by the Transportation Research Board.

The HCM identifies minimum times for "critical gaps" in traffic flows along a "major street" (in this case, Admiralty Way) that will allow an approaching vehicle to safely and comfortably make a left turn across the major street traffic at an unsignalized intersection, as will be necessary at the proposed new northbound left-turn pocket on Admiralty Way in order to access the project's proposed new driveway along that frontage. Critical gap times for such moves, identified in the HCM as "one-stage" left turns (where the subject vehicle makes a left-turn across the opposing major street traffic flow in a single movement), are based on two components, the "initial" minimum gap time needed for a driver to recognize an acceptable gap in the opposing traffic flow and initiate the turn, and the "follow-up" time, which is the incremental additional time necessary following the "initial" gap to accommodate subsequent left-turning vehicles (assuming a continuous queue of vehicles wishing to make the left-turn across the major street traffic flows.

Based on the HCM analysis methodologies, a one-stage left-turn move requires a minimum gap of 7.5 seconds between vehicles in the major street traffic flow, with a follow-up time of an additional 3.5 seconds. Therefore, based on these minimum gap times, a 7.5-second gap in the southbound Admiralty Way traffic flow would allow only one vehicle to make a left turn across the oncoming traffic into the project's proposed new Admiralty Way driveway, while two vehicles could be accommodated by an 11.0-second gap, three vehicles could safely make a left turn during a 14.5-second gap, and so on. Note that, since left-turn exits from the project's proposed Admiralty Way driveway will be prohibited, this evaluation was limited to an analysis of the availability of gaps in southbound Admiralty Way traffic to accommodate northbound left-turns from Admiralty Way into the site's new Admiralty Way driveway.

The number and duration of one-stage gaps in southbound Admiralty Way traffic were identified through field observations and counts conducted on a typical mid-week weekday (Thursday, June 7, 2012) during the same AM (7:00 to 10:00 AM) and PM (4:00 to 7:00 PM) peak commute traffic periods used to evaluate the project's potential impacts to the surrounding intersections. The results of these observations are summarized in Table C-1 for both the morning and afternoon/evening time periods. The actual observed gap data (including the number of gaps, the duration of each gap, and the time each gap occurred) are shown in Table C-2 for both the AM and PM three-hour observation periods.

As shown in Table C-1, a minimum of approximately 66 gaps per hour of sufficient duration (minimum of 7.5 seconds) to accommodate at least one northbound left-turning vehicle were observed during the AM peak period; in total, these gaps would provide sufficient time to allow a minimum of approximately 212 vehicles to execute a northbound left-turn to enter the project's proposed new Admiralty Way driveway during the most congested one hour period, which occurred between approximately 7:00 and 8:00 AM. Over the entire three-hour observation period between 7:00 and 10:00 AM, a total of approximately 226 acceptable gaps were observed, which would allow for a total of approximately 689 northbound left-turns into this driveway during that period. An average of approximately 75 acceptable gaps per hour occurred in southbound Admiralty Way traffic during the AM peak period, which would be sufficient to accommodate an average of approximately 230 vehicles per hour turning left from northbound Admiralty Way into the proposed new project driveway.

Similarly, as also shown in Table C-1, during the overall PM peak period (4:00 and 7:00 PM), a minimum of approximately 57 acceptable gaps per hour were observed during the one-hour period between approximately 4:00 and 5:00 PM, which would allow a total of approximately 190 vehicles to enter the project site via a northbound left-turn from Admiralty Way. Over the course of the entire three-hour afternoon/evening observation period, a total of approximately 201 acceptable gaps in southbound Admiralty Way were observed, which would allow for a total of approximately 633 northbound left-turns. On average, the PM peak commute traffic period exhibited approximately 75 acceptable gaps per hour in southbound Admiralty Way traffic, which would accommodate an average of approximately 211 northbound left-turning vehicles per hour from northbound Admiralty Way into the proposed new project driveway.

As described in detail and shown in Figures 6(a) and 6(b) (Project Driveway Volumes) earlier in the traffic study report, the proposed Parcel 44 redevelopment project is expected to exhibit relatively nominal demands for the proposed northbound left-turn move from Admiralty Way.

During the AM peak hour (when many of the proposed retail or office uses may not yet be at full daily operational levels), a total of only about 10 northbound left-turning vehicles per hour are anticipated, while during the PM peak hour, approximately 49 vehicles per hour would be expected to make this move to access the project site. It should also be noted that the proposed project component uses directly served by the proposed new Admiralty Way driveway (specifically, Buildings IV. V, and VI) can also be accessed via proposed driveways located along Mindanao Way and Bali Way; utilization of these additional driveways was assumed in the assignment of project trips described earlier in this report, which acts to somewhat reduce the number of vehicles that would utilize the new northbound left-turn lane on Admiralty Way.

However, even if the number of vehicles potentially using the new northbound left-turn lane were to increase, the results of the gap study indicate that there is currently more than adequate capacity during both peak hours to accommodate such increases. In fact, a review of the total anticipated driveway volumes for the entire Parcel 44 redevelopment project, described earlier in the “Project Vehicular Access and Operations” section of the traffic study, indicates that the existing minimum capacity for northbound left-turns of approximately 212 vehicles per hour during the AM peak hour actually exceeds the total number of inbound project “driveway” trips (which are not reduced by pass-by activity or by “credits” for the removal of existing site trips) during this time period; a total of approximately 94 inbound AM peak hour trips are anticipated for the entire Parcel 44 project), while during the PM peak hour, the minimum existing left-turn capacity of approximately 190 vehicles per hour represents over 80 percent of the total project inbound driveway volume of approximately 236 trips during this time period. Therefore, the proposed new northbound left-turn pocket, allowing for vehicle access directly into the project site from northbound Admiralty Way, can easily accommodate the anticipated project traffic demands under current traffic conditions in the project vicinity without the need to install a traffic signal or other traffic control devices.

**Table C-1**
**Summary of Analysis for Inbound Traffic (Northbound Left-Turns) at Admiralty Way Project Driveway**
**Thursday June 7, 2012**

**AM Peak Period (7:00 to 10:00 AM)**

**Southbound Gaps for Vehicles Entering Proposed Driveway (During 1-Hour Periods)**

| | | 7:00 - 8:00 | | 7:15 - 8:15 | | 7:30 - 8:30 | | 7:45 - 8:45 | | 8:00 - 9:00 | | 8:15 - 9:15 | | 8:30 - 9:30 | | 8:45 - 9:45 | | 9:00 - 10:00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gap Duration (Seconds) | Vehicles per Gap | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles |
| 7.5 - 11.0 | 1 | 11 | 11 | 14 | 14 | 13 | 13 | 15 | 15 | 19 | 19 | 21 | 21 | 24 | 24 | 22 | 22 | 21 | 21 |
| 11.0 - 14.5 | 2 | 15 | 30 | 22 | 44 | 19 | 38 | 19 | 38 | 18 | 36 | 13 | 26 | 17 | 34 | 21 | 42 | 20 | 40 |
| 14.5 - 18.0 | 3 | 11 | 33 | 9 | 27 | 11 | 33 | 9 | 27 | 10 | 30 | 9 | 27 | 7 | 21 | 7 | 21 | 5 | 15 |
| 18.0 - 21.5 | 4 | 7 | 28 | 8 | 32 | 11 | 44 | 11 | 44 | 10 | 40 | 11 | 44 | 9 | 36 | 8 | 32 | 9 | 36 |
| 21.5 - 25.0 + | 5 | 22 | 110 | 23 | 115 | 25 | 125 | 24 | 120 | 23 | 115 | 22 | 110 | 22 | 110 | 23 | 115 | 25 | 125 |
| **Totals** | | **66** | **212** | **76** | **232** | **79** | **253** | **78** | **244** | **80** | **240** | **76** | **228** | **79** | **225** | **81** | **232** | **80** | **237** |
| **3-Hour Average** | | **75** | **230** | | | | | | | | | | | | | | | | |

**PM Peak Period (4:00 to 7:00 PM)**

**Southbound Gaps for Vehicles Entering Proposed Driveway (During 1-Hour Periods)**

| | | 4:00 - 5:00 | | 4:15 - 5:15 | | 4:30 - 5:30 | | 4:45 - 5:45 | | 5:00 - 6:00 | | 5:15 - 6:15 | | 5:30 - 6:30 | | 5:45 - 6:45 | | 6:00 - 7:00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gap Duration (Seconds) | Vehicles per Gap | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles | No. of Gaps | No. of Vehicles |
| 7.5 - 11.0 | 1 | 14 | 14 | 15 | 15 | 16 | 16 | 15 | 15 | 15 | 15 | 17 | 17 | 18 | 18 | 19 | 19 | 18 | 18 |
| 11.0 - 14.5 | 2 | 5 | 10 | 8 | 16 | 14 | 28 | 16 | 32 | 18 | 36 | 17 | 34 | 10 | 20 | 10 | 20 | 10 | 20 |
| 14.5 - 18.0 | 3 | 7 | 21 | 11 | 33 | 10 | 30 | 13 | 39 | 10 | 30 | 6 | 18 | 8 | 24 | 6 | 18 | 10 | 30 |
| 18.0 - 21.5 | 4 | 10 | 40 | 11 | 44 | 8 | 32 | 7 | 28 | 7 | 28 | 9 | 36 | 11 | 44 | 12 | 48 | 14 | 56 |
| 21.5 - 25.0 + | 5 | 21 | 105 | 23 | 115 | 24 | 120 | 24 | 120 | 22 | 110 | 21 | 105 | 22 | 110 | 23 | 115 | 20 | 100 |
| **Totals** | | **57** | **190** | **68** | **223** | **72** | **226** | **75** | **234** | **72** | **219** | **70** | **210** | **69** | **216** | **70** | **220** | **72** | **224** |
| **3-Hour Average** | | **67** | **211** | | | | | | | | | | | | | | | | |

Note:
Values in RED indicate minimum number of gaps and/or northbound left-turn capacity during observed periods

**Table C-2**
**Gap Timing and Duration Data - Gaps in Southbound Admiralty Way Traffic for Vehicles Entering Proposed Admiralty Way Project Driveway via Northbound Left-Turns**
**Thursday June 7, 2012**

### AM Peak Period (7:00 AM to 10:00 AM)

**7:00 - 7:15 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 7:00 AM | 16 |
| 7:01 AM | 26 |
| 7:02 AM | 24 |
| 7:04 AM | 15 |
| 7:05 AM | 30 |
| 7:07 AM | 20 |
| 7:07 AM | 19 |
| 7:10 AM | 30 |
| 7:11 AM | 15 |
| 7:11 AM | 24 |
| 7:12 AM | 26 |
| 7:13 AM | 9 |

**7:15 - 7:30 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 7:15 AM | 64 |
| 7:17 AM | 10 |
| 7:18 AM | 22 |
| 7:19 AM | 8 |
| 7:19 AM | 7 |
| 7:20 AM | 12 |
| 7:21 AM | 14 |
| 7:22 AM | 11 |
| 7:24 AM | 8 |
| 7:25 AM | 25 |
| 7:26 AM | 12 |
| 7:27 AM | 16 |
| 7:28 AM | 13 |
| 7:28 AM | 16 |
| 7:29 AM | 21 |

**7:30 - 7:45 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 7:30 AM | 15 |
| 7:30 AM | 12 |
| 7:31 AM | 9 |
| 7:31 AM | 15 |
| 7:32 AM | 11 |
| 7:32 AM | 43 |
| 7:33 AM | 8 |
| 7:34 AM | 31 |
| 7:34 AM | 9 |
| 7:34 AM | 6 |
| 7:35 AM | 34 |
| 7:36 AM | 11 |
| 7:37 AM | 45 |
| 7:38 AM | 20 |
| 7:39 AM | 10 |
| 7:39 AM | 25 |
| 7:40 AM | 15 |
| 7:40 AM | 25 |
| 7:42 AM | 15 |
| 7:42 AM | 21 |
| 7:43 AM | 6 |
| 7:44 AM | 13 |
| 7:44 AM | 11 |
| 7:44 AM | 6 |

**7:45 - 8:00 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 7:45 AM | 15 |
| 7:45 AM | 12 |
| 7:45 AM | 59 |
| 7:47 AM | 20 |
| 7:47 AM | 12 |
| 7:49 AM | 18 |
| 7:49 AM | 11 |
| 7:51 AM | 6 |
| 7:51 AM | 8 |
| 7:51 AM | 47 |
| 7:52 AM | 6 |
| 7:52 AM | 12 |
| 7:52 AM | 10 |
| 7:53 AM | 30 |
| 7:53 AM | 10 |
| 7:55 AM | 26 |
| 7:55 AM | 6 |
| 7:55 AM | 11 |
| 7:56 AM | 23 |
| 7:57 AM | 7 |
| 7:57 AM | 28 |
| 7:58 AM | 6 |
| 7:58 AM | 15 |
| 7:59 AM | 56 |

**8:00 - 8:15 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 8:00 AM | 24 |
| 8:01 AM | 19 |
| 8:01 AM | 7 |
| 8:02 AM | 40 |
| 8:02 AM | 11 |
| 8:03 AM | 9 |
| 8:03 AM | 51 |
| 8:04 AM | 6 |
| 8:04 AM | 6 |
| 8:05 AM | 10 |
| 8:06 AM | 21 |
| 8:06 AM | 9 |
| 8:07 AM | 12 |
| 8:08 AM | 14 |
| 8:08 AM | 17 |
| 8:09 AM | 12 |
| 8:09 AM | 8 |
| 8:10 AM | 56 |
| 8:11 AM | 14 |
| 8:11 AM | 13 |
| 8:11 AM | 6 |
| 8:12 AM | 27 |
| 8:12 AM | 25 |
| 8:13 AM | 22 |
| 8:14 AM | 18 |
| 8:14 AM | 12 |

**8:15 - 8:30 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 8:15 AM | 30 |
| 8:16 AM | 8 |
| 8:17 AM | 12 |
| 8:17 AM | 19 |
| 8:18 AM | 20 |
| 8:19 AM | 30 |
| 8:20 AM | 18 |
| 8:20 AM | 27 |
| 8:21 AM | 14 |
| 8:21 AM | 16 |
| 8:22 AM | 16 |
| 8:23 AM | 17 |
| 8:23 AM | 22 |
| 8:23 AM | 6 |
| 8:24 AM | 15 |
| 8:25 AM | 8 |
| 8:26 AM | 35 |
| 8:28 AM | 18 |
| 8:29 AM | 6 |

**8:30 - 8:45 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 8:30 AM | 7 |
| 8:30 AM | 8 |
| 8:30 AM | 11 |
| 8:31 AM | 10 |
| 8:32 AM | 30 |
| 8:32 AM | 30 |
| 8:33 AM | 32 |
| 8:34 AM | 12 |
| 8:35 AM | 6 |
| 8:35 AM | 10 |
| 8:36 AM | 9 |
| 8:36 AM | 9 |
| 8:36 AM | 23 |
| 8:37 AM | 20 |
| 8:38 AM | 17 |
| 8:38 AM | 7 |
| 8:38 AM | 7 |
| 8:39 AM | 12 |
| 8:40 AM | 8 |
| 8:40 AM | 7 |
| 8:40 AM | 6 |
| 8:41 AM | 15 |
| 8:41 AM | 12 |
| 8:42 AM | 21 |
| 8:42 AM | 7 |
| 8:43 AM | 24 |
| 8:43 AM | 12 |
| 8:44 AM | 6 |

**8:45 - 9:00 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 8:45 AM | 8 |
| 8:45 AM | 51 |
| 8:46 AM | 22 |
| 8:47 AM | 11 |
| 8:48 AM | 10 |
| 8:48 AM | 16 |
| 8:48 AM | 12 |
| 8:50 AM | 9 |
| 8:51 AM | 11 |
| 8:51 AM | 19 |
| 8:52 AM | 54 |
| 8:53 AM | 8 |
| 8:53 AM | 7 |
| 8:53 AM | 7 |
| 8:54 AM | 11 |
| 8:54 AM | 22 |
| 8:55 AM | 9 |
| 8:56 AM | 10 |
| 8:56 AM | 17 |
| 8:56 AM | 17 |
| 8:57 AM | 6 |
| 8:57 AM | 35 |
| 8:58 AM | 37 |
| 8:59 AM | 10 |

**9:00 - 9:15 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 9:00 AM | 30 |
| 9:00 AM | 8 |
| 9:02 AM | 34 |
| 9:03 AM | 10 |
| 9:03 AM | 18 |
| 9:04 AM | 9 |
| 9:05 AM | 22 |
| 9:06 AM | 37 |
| 9:07 AM | 10 |
| 9:07 AM | 20 |
| 9:07 AM | 18 |
| 9:09 AM | 23 |
| 9:09 AM | 22 |
| 9:10 AM | 6 |
| 9:11 AM | 7 |
| 9:11 AM | 11 |
| 9:12 AM | 8 |
| 9:12 AM | 10 |
| 9:13 AM | 18 |
| 9:14 AM | 11 |
| 9:14 AM | 6 |

**9:15 - 9:30 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 9:15 AM | 42 |
| 9:16 AM | 24 |
| 9:17 AM | 15 |
| 9:17 AM | 6 |
| 9:18 AM | 27 |
| 9:18 AM | 11 |
| 9:19 AM | 15 |
| 9:19 AM | 7 |
| 9:20 AM | 13 |
| 9:20 AM | 10 |
| 9:21 AM | 20 |
| 9:21 AM | 10 |
| 9:22 AM | 7 |
| 9:22 AM | 40 |
| 9:23 AM | 6 |
| 9:24 AM | 7 |
| 9:24 AM | 10 |
| 9:24 AM | 12 |
| 9:26 AM | 8 |
| 9:26 AM | 32 |
| 9:26 AM | 10 |
| 9:27 AM | 19 |
| 9:27 AM | 6 |
| 9:28 AM | 14 |
| 9:29 AM | 6 |
| 9:29 AM | 13 |
| 9:29 AM | 11 |

**9:30 - 9:45 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 9:30 AM | 35 |
| 9:31 AM | 12 |
| 9:31 AM | 8 |
| 9:32 AM | 34 |
| 9:32 AM | 9 |
| 9:33 AM | 14 |
| 9:33 AM | 30 |
| 9:34 AM | 11 |
| 9:34 AM | 11 |
| 9:35 AM | 12 |
| 9:35 AM | 8 |
| 9:36 AM | 7 |
| 9:36 AM | 16 |
| 9:36 AM | 7 |
| 9:37 AM | 33 |
| 9:38 AM | 32 |
| 9:38 AM | 12 |
| 9:39 AM | 13 |
| 9:40 AM | 75 |
| 9:41 AM | 6 |
| 9:42 AM | 6 |
| 9:42 AM | 10 |
| 9:42 AM | 14 |
| 9:43 AM | 13 |
| 9:43 AM | 7 |
| 9:44 AM | 20 |
| 9:44 AM | 15 |

**9:45 - 10:00 AM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 9:45 AM | 22 |
| 9:45 AM | 12 |
| 9:46 AM | 22 |
| 9:46 AM | 13 |
| 9:46 AM | 6 |
| 9:48 AM | 10 |
| 9:48 AM | 23 |
| 9:49 AM | 24 |
| 9:50 AM | 30 |
| 9:51 AM | 20 |
| 9:51 AM | 14 |
| 9:52 AM | 9 |
| 9:53 AM | 9 |
| 9:53 AM | 10 |
| 9:54 AM | 8 |
| 9:54 AM | 6 |
| 9:54 AM | 8 |
| 9:55 AM | 6 |
| 9:55 AM | 7 |
| 9:55 AM | 16 |
| 9:56 AM | 6 |
| 9:56 AM | 24 |
| 9:57 AM | 31 |
| 9:58 AM | 36 |
| 9:59 AM | 19 |

### PM Peak Period (4:00 PM to 7:00 PM)

**4:00 - 4:15 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 4:03 PM | 7 |
| 4:04 PM | 14 |
| 4:06 PM | 31* |
| 4:10 PM | 34* |
| 4:11 PM | 15 |
| 4:11 PM | 23 |
| 4:12 PM | 13 |
| 4:12 PM | 43 |
| 4:14 PM | 10 |
| 4:14 PM | 22 |

**4:15 - 4:30 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 4:15 PM | 12 |
| 4:15 PM | 17 |
| 4:17 PM | 7 |
| 4:17 PM | 8 |
| 4:17 PM | 16 |
| 4:18 PM | 21 |
| 4:19 PM | 51 |
| 4:20 PM | 20 |
| 4:21 PM | 9 |
| 4:21 PM | 6 |
| 4:21 PM | 6 |
| 4:22 PM | 10 |
| 4:24 PM | 34 |
| 4:25 PM | 30 |
| 4:25 PM | 9 |
| 4:26 PM | 7 |
| 4:26 PM | 6 |
| 4:27 PM | 35 |
| 4:29 PM | 19 |
| 4:29 PM | 10 |

**4:30 - 4:45 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 4:30 PM | 30 |
| 4:31 PM | 19 |
| 4:31 PM | 9 |
| 4:32 PM | 15 |
| 4:33 PM | 29 |
| 4:35 PM | 10 |
| 4:35 PM | 21 |
| 4:36 PM | 25 |
| 4:37 PM | 10 |
| 4:37 PM | 6 |
| 4:38 PM | 19 |
| 4:38 PM | 18 |
| 4:39 PM | 11 |
| 4:39 PM | 6 |
| 4:40 PM | 29 |
| 4:41 PM | 18 |
| 4:42 PM | 30 |
| 4:43 PM | 8 |
| 4:44 PM | 9 |

**4:45 - 5:00 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 4:45 PM | 15 |
| 4:45 PM | 10 |
| 4:45 PM | 9 |
| 4:46 PM | 23 |
| 4:46 PM | 26 |
| 4:47 PM | 19 |
| 4:48 PM | 24 |
| 4:49 PM | 7 |
| 4:50 PM | 37 |
| 4:51 PM | 6 |
| 4:52 PM | 18 |
| 4:53 PM | 15 |
| 4:53 PM | 9 |
| 4:55 PM | 24 |
| 4:55 PM | 26 |
| 4:56 PM | 16 |
| 5:57 PM | 7 |
| 4:57 PM | 12 |
| 4:58 PM | 22 |
| 4:59 PM | 25 |
| 4:59 PM | 24 |

**5:00 - 5:15 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 5:01 PM | 17 |
| 5:01 PM | 23 |
| 5:02 PM | 15 |
| 5:02 PM | 15 |
| 5:03 PM | 20 |
| 5:03 PM | 25 |
| 5:05 PM | 10 |
| 5:05 PM | 11 |
| 5:06 PM | 15 |
| 5:06 PM | 6 |
| 5:06 PM | 6 |
| 5:08 PM | 11 |
| 5:08 PM | 16 |
| 5:10 PM | 11 |
| 5:10 PM | 11 |
| 5:10 PM | 8 |
| 5:11 PM | 34 |
| 5:12 PM | 36 |
| 5:13 PM | 13 |
| 5:14 PM | 30 |

**5:15 - 5:30 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 5:15 PM | 6 |
| 5:16 PM | 7 |
| 5:16 PM | 9 |
| 5:17 PM | 14 |
| 5:17 PM | 26 |
| 5:18 PM | 8 |
| 5:18 PM | 10 |
| 5:18 PM | 23 |
| 5:19 PM | 15 |
| 5:20 PM | 13 |
| 5:20 PM | 8 |
| 5:20 PM | 8 |
| 5:21 PM | 49 |
| 5:23 PM | 23 |
| 5:23 PM | 9 |
| 5:25 PM | 11 |
| 5:25 PM | 12 |
| 5:26 PM | 41 |
| 5:27 PM | 11 |
| 5:27 PM | 13 |
| 5:28 PM | 14 |
| 5:29 PM | 15* |

**5:30 - 5:45 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 5:30 PM | 21 |
| 5:31 PM | 8 |
| 5:31 PM | 19 |
| 5:32 PM | 14 |
| 5:32 PM | 6 |
| 5:32 PM | 14 |
| 5:33 PM | 16 |
| 5:34 PM | 15 |
| 5:34 PM | 14 |
| 5:36 PM | 24 |
| 5:37 PM | 16 |
| 5:38 PM | 9 |
| 5:38 PM | 16 |
| 5:38 PM | 10 |
| 5:40 PM | 23 |
| 5:40 PM | 10 |
| 5:41 PM | 23 |
| 5:42 PM | 20 |
| 5:43 PM | 22 |
| 5:44 PM | 19 |
| 5:44 PM | 40 |

**5:45 - 6:00 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 5:45 PM | 12 |
| 5:45 PM | 7 |
| 5:47 PM | 48 |
| 5:48 PM | 22 |
| 5:49 PM | 7 |
| 5:49 PM | 18 |
| 5:50 PM | 10 |
| 5:50 PM | 27 |
| 5:52 PM | *23 |
| 5:53 PM | 9 |
| 5:53 PM | 22 |
| 5:53 PM | 12 |
| 5:55 PM | 6 |
| 5:55 PM | 21 |
| 5:56 PM | 22 |
| 5:57 PM | 12 |
| 5:57 PM | 26 |
| 5:58 PM | 10 |
| 5:59 PM | 25 |

**6:00 - 6:15 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 6:00 PM | 13 |
| 6:00 PM | 10 |
| 6:02 PM | 36 |
| 6:04 PM | 42 |
| 6:04 PM | 12 |
| 6:05 PM | 13 |
| 6:05 PM | 8 |
| 6:06 PM | 13 |
| 6:07 PM | 6 |
| 6:07 PM | 8 |
| 6:08 PM | 21 |
| 6:09 PM | 10 |
| 6:09 PM | 18 |
| 6:10 PM | 7 |
| 6:10 PM | 16 |
| 6:11 PM | 58 |
| 6:13 PM | 20 |
| 6:14 PM | 28 |

**6:15 - 6:30 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 6:15 PM | 17 |
| 6:15 PM | 6 |
| 6:17 PM | 6 |
| 6:17 PM | 8 |
| 6:18 PM | 9 |
| 6:18 PM | 8 |
| 6:19 PM | 9 |
| 6:20 PM | 30 |
| 6:21 PM | 15 |
| 6:22 PM | 21 |
| 6:23 PM | 23 |
| 6:23 PM | 22 |
| 6:24 PM | 28 |
| 6:25 PM | 8 |
| 6:25 PM | 10 |
| 6:26 PM | 29 |
| 6:26 PM | 7 |
| 6:27 PM | 6 |
| 6:27 PM | 19 |
| 6:28 PM | 26 |
| 6:28 PM | 6 |
| 6:28 PM | 17 |
| 6:29 PM | 9 |

**6:30 - 6:45 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 6:30 PM | 16 |
| 6:31 PM | 29 |
| 6:32 PM | 8 |
| 6:32 PM | 35 |
| 6:34 PM | 37 |
| 6:34 PM | 8 |
| 6:35 PM | 10 |
| 6:35 PM | 11 |
| 6:35 PM | 19 |
| 6:36 PM | 21 |
| 6:37 PM | 26 |
| 6:38 PM | 18 |
| 6:38 PM | 20 |
| 6:39 PM | 17 |
| 6:39 PM | 8 |
| 6:40 PM | 18 |
| 6:41 PM | 13 |
| 6:41 PM | 14 |
| 6:42 PM | 10 |
| 6:43 PM | 30 |
| 6:43 PM | 28 |
| 6:44 PM | 7 |

**6:45 - 7:00 PM**

| Time | Duration of Gap (Seconds) |
|---|---|
| 6:45 PM | 6 |
| 6:45 PM | 19 |
| 6:46 PM | 26 |
| 6:47 PM | 7 |
| 6:47 PM | 21 |
| 6:47 PM | 15 |
| 6:48 PM | 14 |
| 6:49 PM | 18 |
| 6:49 PM | 12 |
| 6:50 PM | 13 |
| 6:50 PM | 7 |
| 6:51 PM | 15 |
| 6:52 PM | 9 |
| 6:52 PM | 7 |
| 6:54 PM | 27 |
| 6:55 PM | 40 |
| 6:56 PM | 16 |
| 6:56 PM | 32 |
| 6:58 PM | 7 |
| 6:58 PM | 17 |
| 6:58 PM | 10 |
| 6:59 PM | 18 |

Notes:

"*" Indicates Admiralty Way Median Island "Cut" for Access to Project Admiralty Way Driveway Blocked Due to Vehicular Queue Backup (in southbound lanes) from Mindanao Way.

**Future (2020) Cumulative Conditions SYNCHRO Analysis Summary**

The intersection geometries used for the SYNCHRO analysis were the same as are currently in place at all of the studied/analyzed locations, with the exception that, as noted earlier, the County's programmed LUP dual southbound left-turn lanes were assumed to be installed at both Admiralty Way and Bali Way, and at Admiralty Way and Mindanao Way, and the project's proposed new northbound left-turn lane on Admiralty Way adjacent to the proposed new driveway location was also implemented. Additionally, since each of the subject intersections (with the exception of the unsignalized "intersection" at the proposed project driveway) are currently equipped with LADOT's ATSAC/ATCS traffic signal synchronization system, for purposes of this supplemental analysis, while the basic traffic signal phasing information for each of the studied intersections was utilized, the SYNCHRO program also assumed that all traffic signal operations would be optimized.

The future year (2020) traffic volumes at the study intersections examined in the supplemental (year 2020) cumulative analyses were derived using the same forecasting methodologies as described earlier in the report to develop the forecast future year 2016 volumes. First, the existing year 2013 traffic volumes utilized in this study were growth-factored to the year 2020 using the same 0.6 percent annual ambient growth factor (compounded annually) as before (except that, instead of three years of growth, this supplemental analysis assumed a total of seven years of ambient traffic growth). The traffic generated by the 30 related projects identified in the study area were then added to these baseline year 2020 traffic volumes; note that no additional related projects were assumed for this supplemental analysis, since the related projects list shown previously in Table 10 already includes all potential future development, both within and surrounding the Marina, currently proposed or anticipated.

Finally, the net traffic generated by the proposed Parcel 44 project itself was added, to form the "Future (2020) Cumulative Traffic Volumes" used in the SYNCHRO analysis. The resulting traffic volumes at each of the intersections included in the SYNCHRO analysis are shown in Figures C-2(a) and C-2(b) for the AM and PM peak hours, respectively. Note also that, as shown in these figures, in order to identify any potential future traffic conflicts with the operations of the existing driveway opposite the proposed new Parcel 44 driveway (on the east side of Admiralty Way, serving the existing medical/commercial office development), empirical traffic counts for this non-project driveway were also included in the analyses.

The analyses and results of the SYNCHRO evaluation are contained in the following pages.

DKS

## P12122 – Marina Del Rey Parcel 44

## Traffic Analysis Summary

The analysis is for the future year (2020) and assumes the following proposed changes:

- Addition of a stop-controlled driveway across from existing driveway on Admiralty Way between Bali Way and Mindanao Way
- Addition of a left turn pocket for northbound traffic to enter proposed driveway
- Placement of a median to allow only right turns from existing and proposed driveways, but to allow left turns into both driveways
- Addition of a second southbound left turn bay at Admiralty Way/Bali Way and Admiralty Way/Mindanao Way

2020 intersection turn movement traffic demands were provided by others.

LOS, average delay and queue results for the study intersections (total and for key movements) are summarized below:

| | AM Peak | | | PM Peak | | |
|---|---|---|---|---|---|---|
| | LOS | Delay (s) | 95% Queue Length (ft) | LOS | Delay (s) | 95% Queue Length (ft) |
| **Admiralty Way & Proposed/Existing Driveway** | | | | | | |
| Intersection | B | 0.1 | --- | B | 0.4 | --- |
| Northbound LT Pocket | B | 15.0 | 2 | C | 17.4 | 14 |
| **Admiralty Way & Bali Way** | | | | | | |
| Intersection | C | 30.9 | --- | C | 35.1 | --- |
| Northbound LT Pocket | F | 177.2 | 13 | E | 62.3 | 12 |
| Southbound LT Pocket | D | 51.5 | 208 | E | 83.2 | 239 |
| Eastbound | D | 45.2 | 23 | D | 46.2 | 46 |
| **Admiralty Way & Mindanao Way** | | | | | | |
| Intersection | D | 38.8 | --- | E | 76.1 | --- |
| Northbound LT Pocket | F | 106.1 | 84 | F | 99.4 | 84 |
| Southbound LT Pocket | E | 58.3 | 227 | E | 65.1 | 343 |
| Eastbound | E | 58.5 | 53 | E | 57.9 | 167 |

Note:

1. LOS based on ICU methodology. Average delay for all vehicles including those that do not stop.

Key findings/conclusions:

- There is no persistent queue in the proposed northbound left-turn pocket. Left turning vehicles are able to enter the proposed driveway with an average delay of about 15 seconds.
- Proposed northbound left-turn pocket only needs to be long enough to hold 2-3 vehicles; the simulated queue is at most one car.
- Southbound left-turning vehicles at **Bali Way** do not overflow the dual left-turn pocket, however some left-turning vehicles are blocked in entering the pocket by the queue for the through traffic during the PM peak. This is not a problem during the AM peak.
- There is a low volume of northbound left-turning vehicles at **Bali Way**, however they are blocked in entering the left-turn pocket during a red light by the queue for the through traffic during the AM and PM peaks.
- The northbound queue for the through traffic at **Bali Way** occasionally spills over past the proposed driveway during the AM and PM peaks. We suggest that the pavement at the proposed driveway be striped to keep the intersection clear to allow for southbound left turning vehicles to enter the existing driveway
- Southbound left-turning vehicles at **Mindanao Way** do not overflow the dual left-turn pockets during the AM peak period and are in general not blocked in entering the pocket by the queue for the through traffic. However, <u>during the PM peak period these vehicles do overflow the dual left-turn pockets, impacting the through lanes. The resulting queue can extend beyond the project driveway and even impact the Bali intersection.</u>
- There is a low volume of northbound left-turning vehicles at **Mindanao Way**, however they are **blocked in entering the left-turn pocket** during a red light by the queue for the through traffic during the AM and PM peaks.
- The eastbound approach for **Bali Way** at **Admiralty Way** performs at an acceptable LOS.
- The eastbound approach for **Mindanao Way** at **Admiralty Way** is forecast to operate at LOS E; however, it is not possible to provide additional green time because the other approaches also operate at poor LOS. For example, the northbound approach has much higher volumes and performs worse.
- As noted above, the northbound left turn movements at both **Bali Way** and **Mindanao Way** do not appear to be a problem. Rather, it is more an issue of the queues for the through movements extending upstream and often blocking access to the left turn bays.
- <u>In the southbound direction, high southbound left turn movement at **Mindanao Way** does result in queues spilling beyond the turn pocket, impacting through movements as well the upstream intersections at the proposed project driveway and at Bali Way.</u> The southbound left turn movement at **Bali Way** does not appear to be a problem

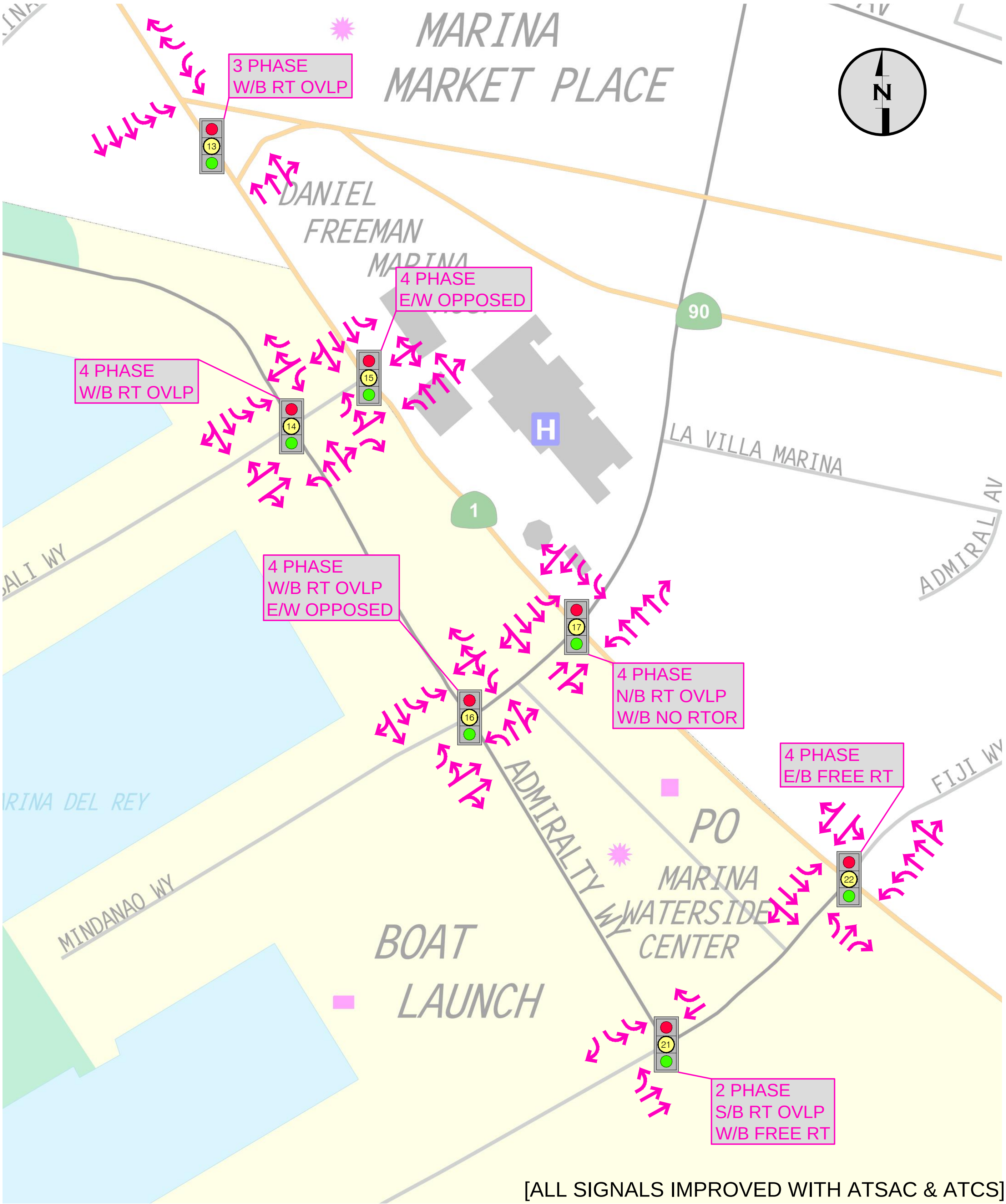



FIGURE C-1



HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

FUTURE (2020) SYNCHRO ANALYSIS
INTERSECTION LANE CONFIGURATIONS AND CONTROLS

PARCEL 44 \ SYNCHRO-VOLS-AM

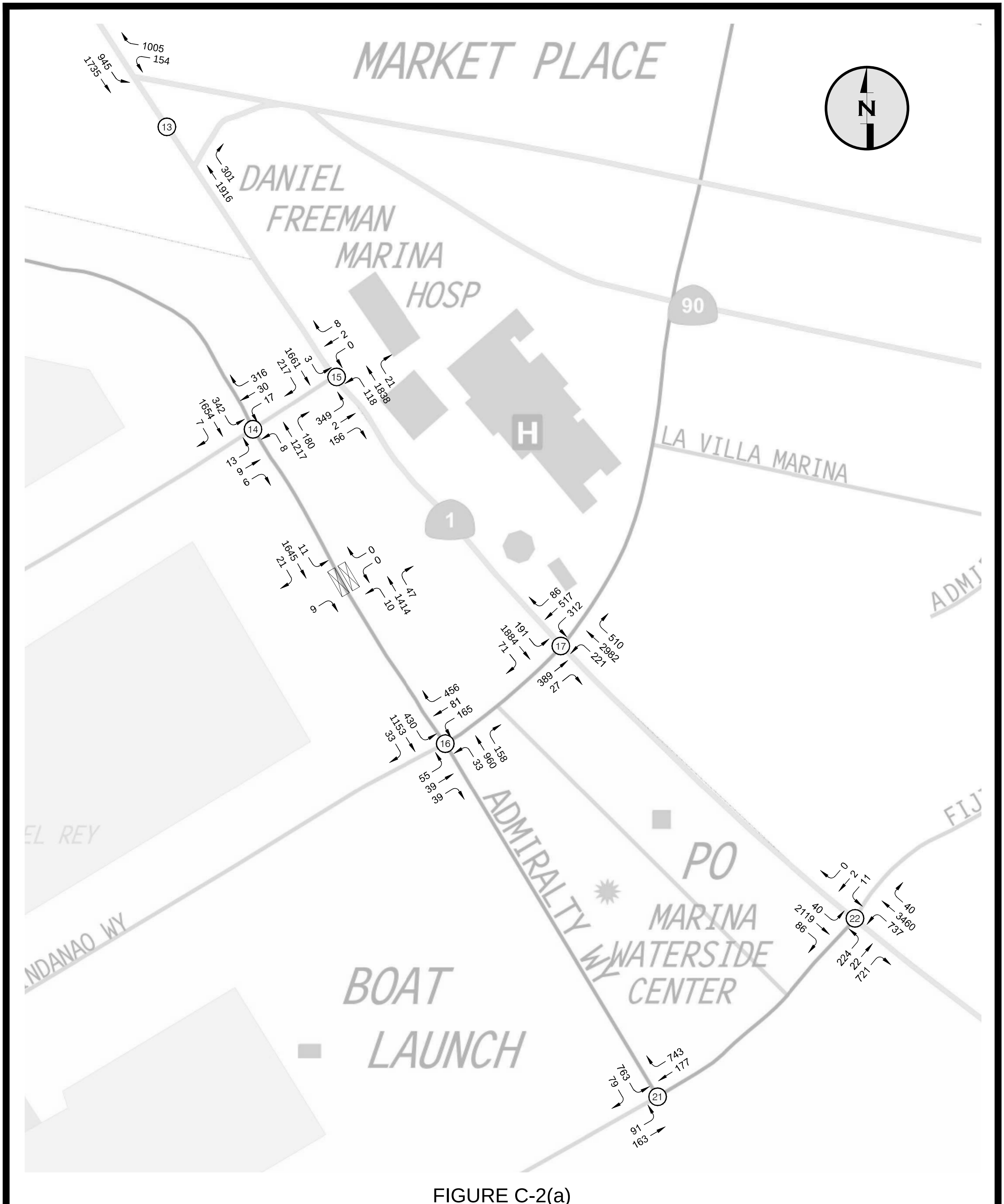



FIGURE C-2(a)

10/16/2013

HIRSCH
GREEN
Hirsch/Green Transportation Consulting, Inc.

FUTURE (2020) TRAFFIC VOLUMES
WITH CUMULATIVE DEVELOPMENT
AM PEAK HOUR

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 49 | 95 | 161 | 309 | 293 | 36 | 1215 | 467 | 1289 |
| v/c Ratio | 0.43 | 0.36 | 0.48 | 0.86 | 0.44 | 0.56 | 0.88 | 0.65 | 0.85 |
| Control Delay | 69.3 | 37.2 | 36.6 | 42.1 | 1.8 | 93.8 | 46.0 | 60.4 | 29.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 69.3 | 37.2 | 36.6 | 42.5 | 1.8 | 93.8 | 46.0 | 60.4 | 29.7 |
| Queue Length 50th (ft) | 43 | 23 | 68 | 90 | 7 | 31 | 513 | 151 | 540 |
| Queue Length 95th (ft) | 92 | 53 | m90 | m114 | m10 | #84 | #670 | 227 | #684 |
| Internal Link Dist (ft) | | 331 | | 104 | | | 140 | | 515 |
| Turn Bay Length (ft) | | | 170 | | | 100 | | 260 | |
| Base Capacity (vph) | 124 | 282 | 374 | 392 | 686 | 64 | 1374 | 754 | 1512 |
| Starvation Cap Reductn | 0 | 0 | 0 | 5 | 11 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.40 | 0.34 | 0.43 | 0.80 | 0.43 | 0.56 | 0.88 | 0.62 | 0.85 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 55 | 39 | 39 | 165 | 81 | 456 | 33 | 960 | 158 | 430 | 1153 | 33 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.91 | 0.91 | | 0.95 | 0.91 | 0.95 | 1.00 | 0.95 | | 0.97 | 0.95 | |
| Frt | 1.00 | 0.93 | | 1.00 | 0.90 | 0.85 | 1.00 | 0.98 | | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 0.99 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1610 | 3147 | | 1681 | 1524 | 1504 | 1770 | 3464 | | 3433 | 3524 | |
| Flt Permitted | 0.95 | 0.99 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1610 | 3147 | | 1681 | 1524 | 1504 | 1770 | 3464 | | 3433 | 3524 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 60 | 42 | 42 | 179 | 88 | 496 | 36 | 1043 | 172 | 467 | 1253 | 36 |
| RTOR Reduction (vph) | 0 | 39 | 0 | 0 | 54 | 55 | 0 | 10 | 0 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 49 | 56 | 0 | 161 | 255 | 238 | 36 | 1205 | 0 | 467 | 1287 | 0 |
| Turn Type | Split | NA | | Split | NA | pm+ov | Prot | NA | | Prot | NA | |
| Protected Phases | 7 | 7 | | 3 | 3 | 1 8 | 5 | 2 | | 1 8 | 6 | |
| Permitted Phases | | | | | | 3 | | | | | | |
| Actuated Green, G (s) | 8.1 | 8.1 | | 25.0 | 25.0 | 52.9 | 4.1 | 49.8 | | 27.9 | 53.6 | |
| Effective Green, g (s) | 9.3 | 9.3 | | 26.2 | 26.2 | 51.9 | 3.6 | 51.1 | | 27.4 | 54.9 | |
| Actuated g/C Ratio | 0.07 | 0.07 | | 0.20 | 0.20 | 0.40 | 0.03 | 0.39 | | 0.21 | 0.42 | |
| Clearance Time (s) | 5.2 | 5.2 | | 5.2 | 5.2 | | 3.5 | 5.3 | | | 5.3 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 115 | 225 | | 338 | 307 | 600 | 49 | 1361 | | 723 | 1488 | |
| v/s Ratio Prot | c0.03 | 0.02 | | 0.10 | c0.17 | 0.08 | 0.02 | 0.35 | | c0.14 | c0.37 | |
| v/s Ratio Perm | | | | | | 0.07 | | | | | | |
| v/c Ratio | 0.43 | 0.25 | | 0.48 | 0.83 | 0.40 | 0.73 | 0.89 | | 0.65 | 0.87 | |
| Uniform Delay, d1 | 57.8 | 57.0 | | 45.8 | 49.8 | 27.9 | 62.7 | 36.7 | | 46.9 | 34.2 | |
| Progression Factor | 1.00 | 1.00 | | 0.73 | 0.66 | 0.04 | 1.00 | 1.00 | | 1.21 | 0.70 | |
| Incremental Delay, d2 | 2.5 | 0.6 | | 0.7 | 11.9 | 0.3 | 43.4 | 8.8 | | 1.5 | 5.2 | |
| Delay (s) | 60.3 | 57.6 | | 34.4 | 44.7 | 1.3 | 106.1 | 45.5 | | 58.3 | 29.1 | |
| Level of Service | E | E | | C | D | A | F | D | | E | C | |
| Approach Delay (s) | | 58.5 | | | 25.9 | | | 47.2 | | | 36.9 | |
| Approach LOS | | E | | | C | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 38.8 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.81 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 72.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 31 | 18 | 191 | 185 | 11 | 1519 | 372 | 1806 |
| v/c Ratio | 0.06 | 0.08 | 0.48 | 0.32 | 0.20 | 0.76 | 0.67 | 0.69 |
| Control Delay | 35.2 | 48.6 | 18.8 | 27.5 | 55.4 | 41.5 | 58.0 | 12.1 |
| Queue Delay | 0.0 | 0.0 | 1.9 | 6.2 | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 35.2 | 48.6 | 20.7 | 33.7 | 55.4 | 41.5 | 58.2 | 12.1 |
| Queue Length 50th (ft) | 8 | 10 | 27 | 80 | 8 | 657 | 154 | 377 |
| Queue Length 95th (ft) | 23 | m20 | m104 | m163 | m13 | 753 | 208 | 576 |
| Internal Link Dist (ft) | 297 | | 169 | | | 289 | | 407 |
| Turn Bay Length (ft) | | 200 | | 200 | 130 | | 200 | |
| Base Capacity (vph) | 561 | 274 | 436 | 572 | 55 | 2009 | 554 | 2630 |
| Starvation Cap Reductn | 0 | 0 | 129 | 329 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.07 | 0.62 | 0.76 | 0.20 | 0.76 | 0.69 | 0.69 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 13 | 9 | 6 | 17 | 30 | 316 | 10 | 1217 | 180 | 342 | 1654 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 0.95 | | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | | 0.97 | 0.95 | |
| Frt | | 0.97 | | 1.00 | 0.88 | 0.85 | 1.00 | 0.98 | | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 3344 | | 1770 | 1550 | 1504 | 1770 | 3471 | | 3433 | 3537 | |
| Flt Permitted | | 0.81 | | 0.74 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 2778 | | 1371 | 1550 | 1504 | 1770 | 3471 | | 3433 | 3537 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 14 | 10 | 7 | 18 | 33 | 343 | 11 | 1323 | 196 | 372 | 1798 | 8 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 131 | 29 | 0 | 9 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 25 | 0 | 18 | 60 | 156 | 11 | 1510 | 0 | 372 | 1806 | 0 |
| Turn Type | Perm | NA | | Perm | NA | pm+ov | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | 1 | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 21.1 | | 21.1 | 21.1 | 44.9 | 2.0 | 71.9 | | 23.8 | 93.7 | |
| Effective Green, g (s) | | 22.1 | | 22.1 | 22.1 | 42.9 | 1.0 | 73.1 | | 22.8 | 94.9 | |
| Actuated g/C Ratio | | 0.17 | | 0.17 | 0.17 | 0.33 | 0.01 | 0.56 | | 0.18 | 0.73 | |
| Clearance Time (s) | | 5.0 | | 5.0 | 5.0 | 3.0 | 3.0 | 5.2 | | 3.0 | 5.2 | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 472 | | 233 | 263 | 542 | 13 | 1951 | | 602 | 2582 | |
| v/s Ratio Prot | | | | | 0.04 | c0.05 | 0.01 | c0.44 | | 0.11 | c0.51 | |
| v/s Ratio Perm | | 0.01 | | 0.01 | | 0.05 | | | | | | |
| v/c Ratio | | 0.05 | | 0.08 | 0.23 | 0.29 | 0.85 | 0.77 | | 0.62 | 0.70 | |
| Uniform Delay, d1 | | 45.2 | | 45.4 | 46.6 | 32.2 | 64.4 | 22.1 | | 49.6 | 9.7 | |
| Progression Factor | | 1.00 | | 1.13 | 1.43 | 1.23 | 0.82 | 1.81 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.0 | | 0.1 | 0.4 | 0.2 | 125.0 | 1.9 | | 1.9 | 1.6 | |
| Delay (s) | | 45.2 | | 51.3 | 67.1 | 39.8 | 177.6 | 41.9 | | 51.5 | 11.3 | |
| Level of Service | | D | | D | E | D | F | D | | D | B | |
| Approach Delay (s) | | 45.2 | | | 53.5 | | | 42.9 | | | 18.1 | |
| Approach LOS | | D | | | D | | | D | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 30.9 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 71.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 0 | 9 | 0 | 0 | 0 | 10 | 1414 | 47 | 11 | 1645 | 21 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 10 | 0 | 0 | 0 | 11 | 1537 | 51 | 12 | 1788 | 23 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 595 | | | 369 | |
| pX, platoon unblocked | 0.84 | 0.84 | 0.69 | 0.84 | 0.84 | 0.69 | 0.69 | | | 0.69 | | |
| vC, conflicting volume | 2602 | 3422 | 894 | 2512 | 3419 | 794 | 1811 | | | 1588 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 878 | 1849 | 0 | 771 | 1846 | 0 | 1278 | | | 951 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 100 | 100 | 99 | 100 | 100 | 100 | 97 | | | 98 | | |
| cM capacity (veh/h) | 196 | 59 | 749 | 232 | 59 | 747 | 372 | | | 495 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 | SB 4 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 10 | 0 | 11 | 1025 | 563 | 12 | 894 | 894 | 23 |
| Volume Left | 0 | 0 | 11 | 0 | 0 | 12 | 0 | 0 | 0 |
| Volume Right | 10 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 23 |
| cSH | 749 | 1700 | 372 | 1700 | 1700 | 495 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.03 | 0.60 | 0.33 | 0.02 | 0.53 | 0.53 | 0.01 |
| Queue Length 95th (ft) | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Control Delay (s) | 9.9 | 0.0 | 15.0 | 0.0 | 0.0 | 12.5 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | A | B | | | B | | | |
| Approach Delay (s) | 9.9 | 0.0 | 0.1 | | | 0.1 | | | |
| Approach LOS | A | A | | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 55.5% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

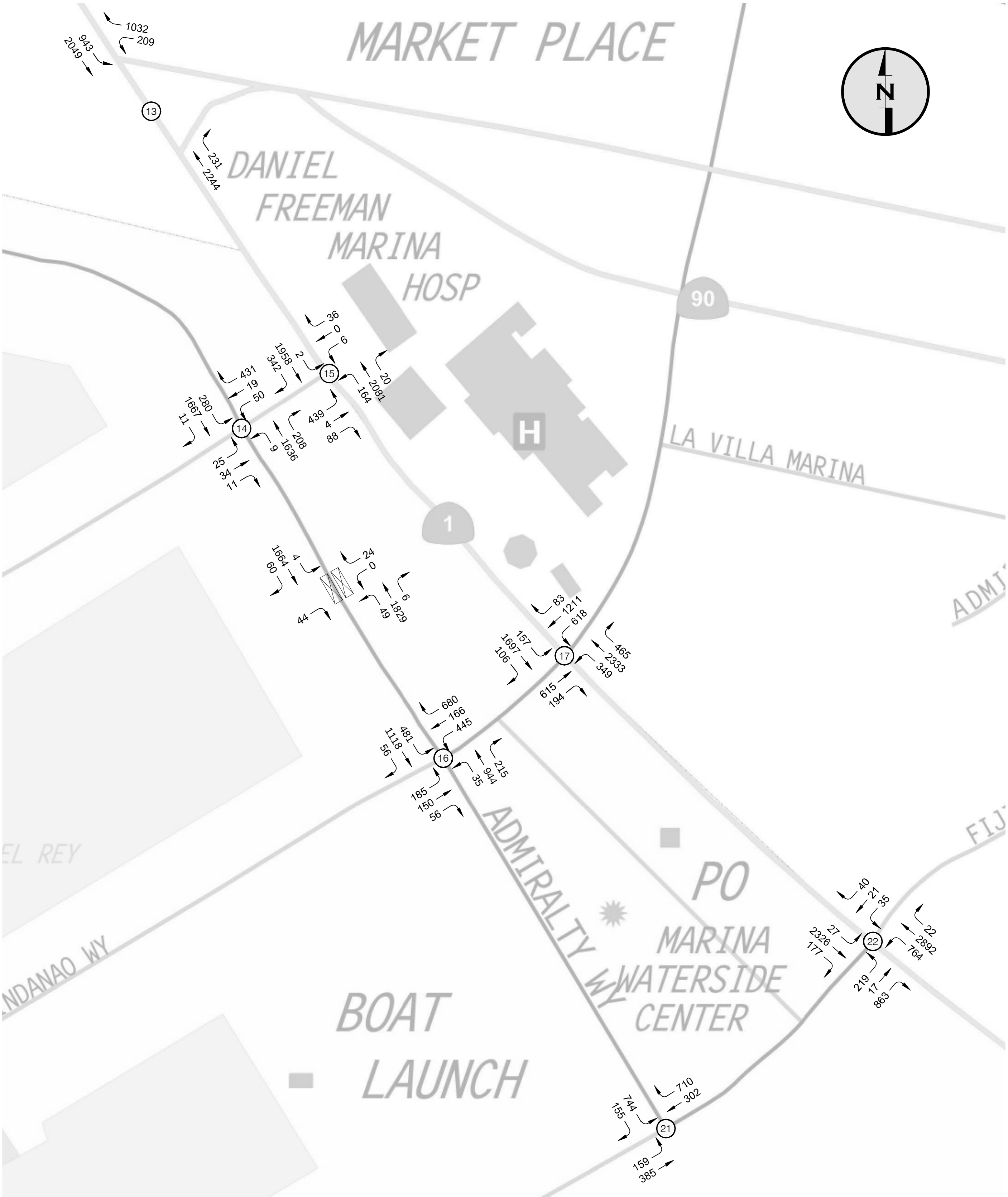



FIGURE C-2(b)

FUTURE (2020) TRAFFIC VOLUMES
WITH CUMULATIVE DEVELOPMENT
PM PEAK HOUR



Hirsch/Green Transportation Consulting, Inc.

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 141 | 284 | 436 | 501 | 466 | 38 | 1260 | 523 | 1276 |
| v/c Ratio | 0.70 | 0.67 | 0.99 | 1.14 | 0.69 | 0.56 | 1.12 | 0.91 | 0.95 |
| Control Delay | 73.0 | 58.1 | 82.1 | 122.0 | 14.2 | 91.0 | 105.9 | 69.9 | 42.0 |
| Queue Delay | 5.2 | 0.7 | 35.0 | 0.5 | 0.7 | 0.0 | 1.5 | 0.0 | 0.0 |
| Total Delay | 78.2 | 58.8 | 117.2 | 122.4 | 14.9 | 91.0 | 107.4 | 69.9 | 42.0 |
| Queue Length 50th (ft) | 125 | 116 | 358 | ~502 | 138 | 32 | ~636 | 212 | 558 |
| Queue Length 95th (ft) | 206 | 167 | m#382 | m#515 | m144 | #84 | #777 | #343 | #717 |
| Internal Link Dist (ft) | | 331 | | 104 | | | 140 | | 515 |
| Turn Bay Length (ft) | | | 170 | | | 100 | | 260 | |
| Base Capacity (vph) | 222 | 467 | 439 | 438 | 680 | 68 | 1126 | 573 | 1349 |
| Starvation Cap Reductn | 0 | 0 | 48 | 22 | 18 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 40 | 40 | 0 | 3 | 51 | 0 | 301 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.77 | 0.67 | 1.12 | 1.20 | 0.74 | 0.56 | 1.53 | 0.91 | 0.95 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 185 | 150 | 56 | 445 | 166 | 680 | 35 | 944 | 215 | 481 | 1118 | 56 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.91 | 0.91 | | 0.95 | 0.91 | 0.95 | 1.00 | 0.95 | | 0.97 | 0.95 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.92 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 0.99 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1610 | 3247 | | 1681 | 1549 | 1504 | 1770 | 3441 | | 3433 | 3514 | |
| Flt Permitted | 0.95 | 0.99 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1610 | 3247 | | 1681 | 1549 | 1504 | 1770 | 3441 | | 3433 | 3514 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 201 | 163 | 61 | 484 | 180 | 739 | 38 | 1026 | 234 | 523 | 1215 | 61 |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 33 | 37 | 0 | 15 | 0 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 141 | 266 | 0 | 436 | 468 | 429 | 38 | 1245 | 0 | 523 | 1274 | 0 |
| Turn Type | Split | NA | | Split | NA | pm+ov | Prot | NA | | Prot | NA | |
| Protected Phases | 7 | 7 | | 3 | 3 | 1 8 | 5 | 2 | | 1 8 | 6 | |
| Permitted Phases | | | | | | 3 | | | | | | |
| Actuated Green, G (s) | 15.1 | 15.1 | | 32.8 | 32.8 | 55.0 | 4.4 | 40.7 | | 22.2 | 47.8 | |
| Effective Green, g (s) | 16.3 | 16.3 | | 34.0 | 34.0 | 54.0 | 3.9 | 42.0 | | 21.7 | 49.1 | |
| Actuated g/C Ratio | 0.13 | 0.13 | | 0.26 | 0.26 | 0.42 | 0.03 | 0.32 | | 0.17 | 0.38 | |
| Clearance Time (s) | 5.2 | 5.2 | | 5.2 | 5.2 | | 3.5 | 5.3 | | | 5.3 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 201 | 407 | | 439 | 405 | 624 | 53 | 1111 | | 573 | 1327 | |
| v/s Ratio Prot | c0.09 | 0.08 | | 0.26 | c0.30 | 0.11 | 0.02 | c0.36 | | c0.15 | 0.36 | |
| v/s Ratio Perm | | | | | | 0.17 | | | | | | |
| v/c Ratio | 0.70 | 0.65 | | 0.99 | 1.15 | 0.69 | 0.72 | 1.12 | | 0.91 | 0.96 | |
| Uniform Delay, d1 | 54.5 | 54.2 | | 47.9 | 48.0 | 31.1 | 62.5 | 44.0 | | 53.2 | 39.5 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 0.69 | 1.00 | 1.00 | | 0.99 | 0.75 | |
| Incremental Delay, d2 | 10.5 | 3.7 | | 33.8 | 87.9 | 2.2 | 36.9 | 66.6 | | 15.1 | 13.6 | |
| Delay (s) | 65.1 | 57.9 | | 81.8 | 136.0 | 23.8 | 99.4 | 110.6 | | 67.6 | 43.4 | |
| Level of Service | E | E | | F | F | C | F | F | | E | D | |
| Approach Delay (s) | | 60.3 | | | 81.9 | | | 110.3 | | | 50.4 | |
| Approach LOS | | E | | | F | | | F | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 76.0 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.07 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 91.2% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 76 | 54 | 246 | 243 | 11 | 2004 | 304 | 1824 |
| v/c Ratio | 0.19 | 0.24 | 0.65 | 0.53 | 0.15 | 0.88 | 1.05 | 0.70 |
| Control Delay | 37.7 | 64.3 | 46.2 | 52.7 | 55.9 | 33.8 | 122.5 | 13.2 |
| Queue Delay | 0.0 | 0.0 | 15.1 | 68.9 | 0.0 | 1.7 | 20.9 | 0.0 |
| Total Delay | 37.7 | 64.3 | 61.3 | 121.6 | 55.9 | 35.5 | 143.4 | 13.2 |
| Queue Length 50th (ft) | 23 | 49 | 142 | 203 | 9 | 858 | ~143 | 386 |
| Queue Length 95th (ft) | 46 | m58 | m183 | m236 | m12 | m819 | #239 | 634 |
| Internal Link Dist (ft) | 297 | | 169 | | | 289 | | 407 |
| Turn Bay Length (ft) | | 200 | | 200 | 130 | | 200 | |
| Base Capacity (vph) | 490 | 272 | 431 | 461 | 122 | 2277 | 290 | 2603 |
| Starvation Cap Reductn | 0 | 0 | 165 | 310 | 0 | 138 | 0 | 0 |
| Spillback Cap Reductn | 5 | 0 | 0 | 0 | 0 | 0 | 60 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.20 | 0.92 | 1.61 | 0.09 | 0.94 | 1.32 | 0.70 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 25 | 34 | 11 | 50 | 19 | 431 | 10 | 1636 | 208 | 280 | 1667 | 11 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 0.95 | | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | | 0.97 | 0.95 | |
| Frt | | 0.98 | | 1.00 | 0.86 | 0.85 | 1.00 | 0.98 | | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 3395 | | 1770 | 1527 | 1504 | 1770 | 3479 | | 3433 | 3536 | |
| Flt Permitted | | 0.67 | | 0.70 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 2314 | | 1313 | 1527 | 1504 | 1770 | 3479 | | 3433 | 3536 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 27 | 37 | 12 | 54 | 21 | 468 | 11 | 1778 | 226 | 304 | 1812 | 12 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 119 | 33 | 0 | 7 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 66 | 0 | 54 | 127 | 210 | 11 | 1997 | 0 | 304 | 1824 | 0 |
| Turn Type | Perm | NA | | Perm | NA | pm+ov | Prot | NA | | Prot | NA | |
| Protected Phases | | 4 | | | 8 | 1 | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | | | | | | |
| Actuated Green, G (s) | | 21.2 | | 21.2 | 21.2 | 35.0 | 2.9 | 81.8 | | 13.8 | 92.7 | |
| Effective Green, g (s) | | 22.2 | | 22.2 | 22.2 | 33.0 | 1.9 | 83.0 | | 12.8 | 93.9 | |
| Actuated g/C Ratio | | 0.17 | | 0.17 | 0.17 | 0.25 | 0.01 | 0.64 | | 0.10 | 0.72 | |
| Clearance Time (s) | | 5.0 | | 5.0 | 5.0 | 3.0 | 3.0 | 5.2 | | 3.0 | 5.2 | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 395 | | 224 | 260 | 428 | 25 | 2221 | | 338 | 2554 | |
| v/s Ratio Prot | | | | | 0.08 | c0.05 | 0.01 | c0.57 | | c0.09 | 0.52 | |
| v/s Ratio Perm | | 0.03 | | 0.04 | | 0.09 | | | | | | |
| v/c Ratio | | 0.17 | | 0.24 | 0.49 | 0.49 | 0.44 | 0.90 | | 0.90 | 0.71 | |
| Uniform Delay, d1 | | 46.0 | | 46.6 | 48.7 | 41.3 | 63.5 | 19.9 | | 58.0 | 10.4 | |
| Progression Factor | | 1.00 | | 1.42 | 2.16 | 1.65 | 0.91 | 1.60 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.2 | | 0.3 | 0.7 | 0.4 | 4.7 | 2.6 | | 25.2 | 1.7 | |
| Delay (s) | | 46.2 | | 66.5 | 106.1 | 68.5 | 62.3 | 34.5 | | 83.2 | 12.1 | |
| Level of Service | | D | | E | F | E | E | C | | F | B | |
| Approach Delay (s) | | 46.2 | | | 85.3 | | | 34.6 | | | 22.2 | |
| Approach LOS | | D | | | F | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 35.1 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.82 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 87.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 0 | 44 | 0 | 0 | 24 | 49 | 1829 | 6 | 4 | 1664 | 60 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 48 | 0 | 0 | 26 | 53 | 1988 | 7 | 4 | 1809 | 65 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 595 | | | 369 | |
| pX, platoon unblocked | 0.83 | 0.83 | 0.68 | 0.83 | 0.83 | 0.70 | 0.68 | | | 0.70 | | |
| vC, conflicting volume | 2944 | 3918 | 904 | 3059 | 3980 | 997 | 1874 | | | 1995 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1306 | 2480 | 0 | 1444 | 2555 | 139 | 1343 | | | 1564 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 100 | 100 | 94 | 100 | 100 | 96 | 85 | | | 99 | | |
| cM capacity (veh/h) | 81 | 20 | 737 | 63 | 18 | 618 | 346 | | | 293 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 | SB 4 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 48 | 26 | 53 | 1325 | 669 | 4 | 904 | 904 | 65 |
| Volume Left | 0 | 0 | 53 | 0 | 0 | 4 | 0 | 0 | 0 |
| Volume Right | 48 | 26 | 0 | 0 | 7 | 0 | 0 | 0 | 65 |
| cSH | 737 | 618 | 346 | 1700 | 1700 | 293 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.06 | 0.04 | 0.15 | 0.78 | 0.39 | 0.01 | 0.53 | 0.53 | 0.04 |
| Queue Length 95th (ft) | 5 | 3 | 13 | 0 | 0 | 1 | 0 | 0 | 0 |
| Control Delay (s) | 10.2 | 11.1 | 17.3 | 0.0 | 0.0 | 17.5 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | B | C | | | C | | | |
| Approach Delay (s) | 10.2 | 11.1 | 0.4 | | | 0.0 | | | |
| Approach LOS | B | B | | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 0.4 | | | |
| Intersection Capacity Utilization | 60.7% | ICU Level of Service | | B |
| Analysis Period (min) | 15 | | | |

# DRIVEWAY COUNT SUMMARY

CLIENT: Hirsch/Green Transportation Consulting, Inc.
PROJECT: 4640 Admiralty Way - Marina del Rey
DATE: Thursday, July 14, 2012
PERIOD: 07:00 AM to 10:00 AM
04:00 PM to 07:00 PM

**AM and PM Peak Period Traffic Volumes at Existing Driveway on Admiralty Way Opposite Proposed Parcel 44 Driveway**

| | AM Peak Period | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inbound | | Outbound | | Totals | | Driveway Total |
| Period: | SBLT | NBRT | WBRT | WBLT | Inbound | Outbound | |
| 0700-0715 | 3 | 16 | 0 | 0 | 19 | 0 | 19 |
| 0715-0730 | 3 | 13 | 0 | 0 | 16 | 0 | 16 |
| 0730-0745 | 10 | 17 | 0 | 0 | 27 | 0 | 27 |
| 0745-0800 | 5 | 30 | 0 | 0 | 35 | 0 | 35 |
| 0800-0815 | 12 | 42 | 1 | 0 | 54 | 1 | 55 |
| 0815-0830 | 11 | 47 | 0 | 0 | 58 | 0 | 58 * |
| 0830-0845 | 9 | 40 | 3 | 0 | 49 | 3 | 52 |
| 0845-0900 | 14 | 36 | 2 | 0 | 50 | 2 | 52 |
| 0900-0915 | 13 | 31 | 2 | 2 | 44 | 4 | 48 |
| 0915-0930 | 3 | 21 | 3 | 0 | 24 | 3 | 27 |
| 0930-0945 | 6 | 18 | 5 | 1 | 24 | 6 | 30 |
| 0945-1000 | 4 | 14 | 5 | 0 | 18 | 5 | 23 |

| | PM Peak Period | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inbound | | Outbound | | Totals | | Driveway Total |
| Period: | SBLT | NBRT | WBRT | WBLT | Inbound | Outbound | |
| 0400-0415 | 6 | 3 | 7 | 0 | 9 | 7 | 16 |
| 0415-0430 | 7 | 2 | 8 | 1 | 9 | 9 | 18 |
| 0430-0445 | 7 | 5 | 5 | 0 | 12 | 5 | 17 |
| 0445-0500 | 7 | 3 | 15 | 0 | 10 | 15 | 25 |
| 0500-0515 | 4 | 6 | 24 | 0 | 10 | 24 | 34 * |
| 0515-0530 | 7 | 3 | 17 | 1 | 10 | 18 | 28 |
| 0530-0545 | 9 | 6 | 15 | 1 | 15 | 16 | 31 |
| 0545-0600 | 3 | 2 | 8 | 0 | 5 | 8 | 13 |
| 0600-0615 | 8 | 0 | 13 | 0 | 8 | 13 | 21 |
| 0615-0630 | 4 | 0 | 14 | 1 | 4 | 15 | 19 |
| 0630-0645 | 6 | 0 | 13 | 0 | 6 | 13 | 19 |
| 0645-0700 | 6 | 3 | 7 | 0 | 9 | 7 | 16 |

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

# APPENDIX D

# SEMI-TRAILER TRUCK AND AUTO/BOAT TRAILER TURNING MOVEMENT ASSESSMENT

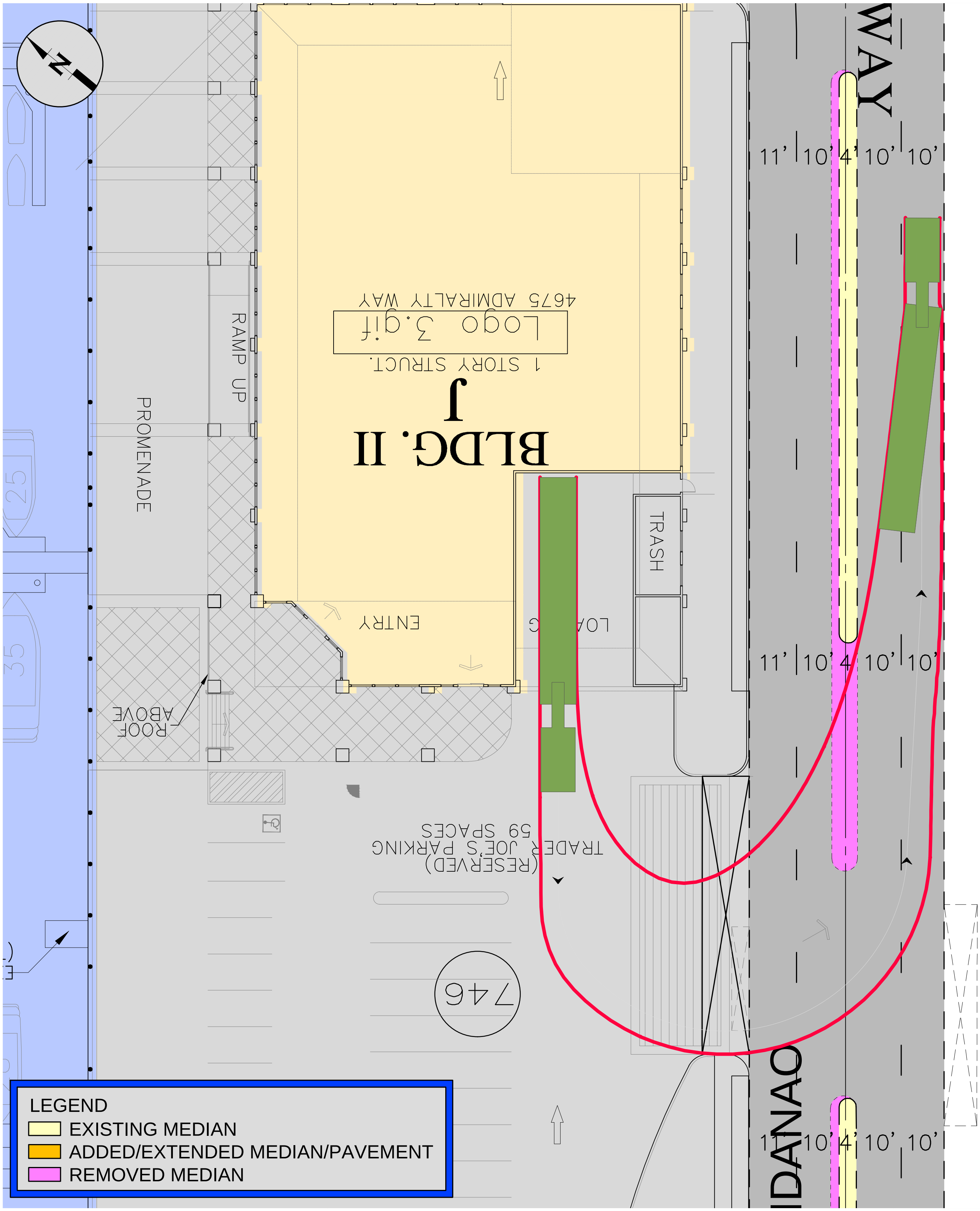



FIGURE D-1

10/15/2013

Hirsch/Green Transportation Consulting, Inc.

MINDANAO WAY
WB-62 SEMI EXIT MANEUVER

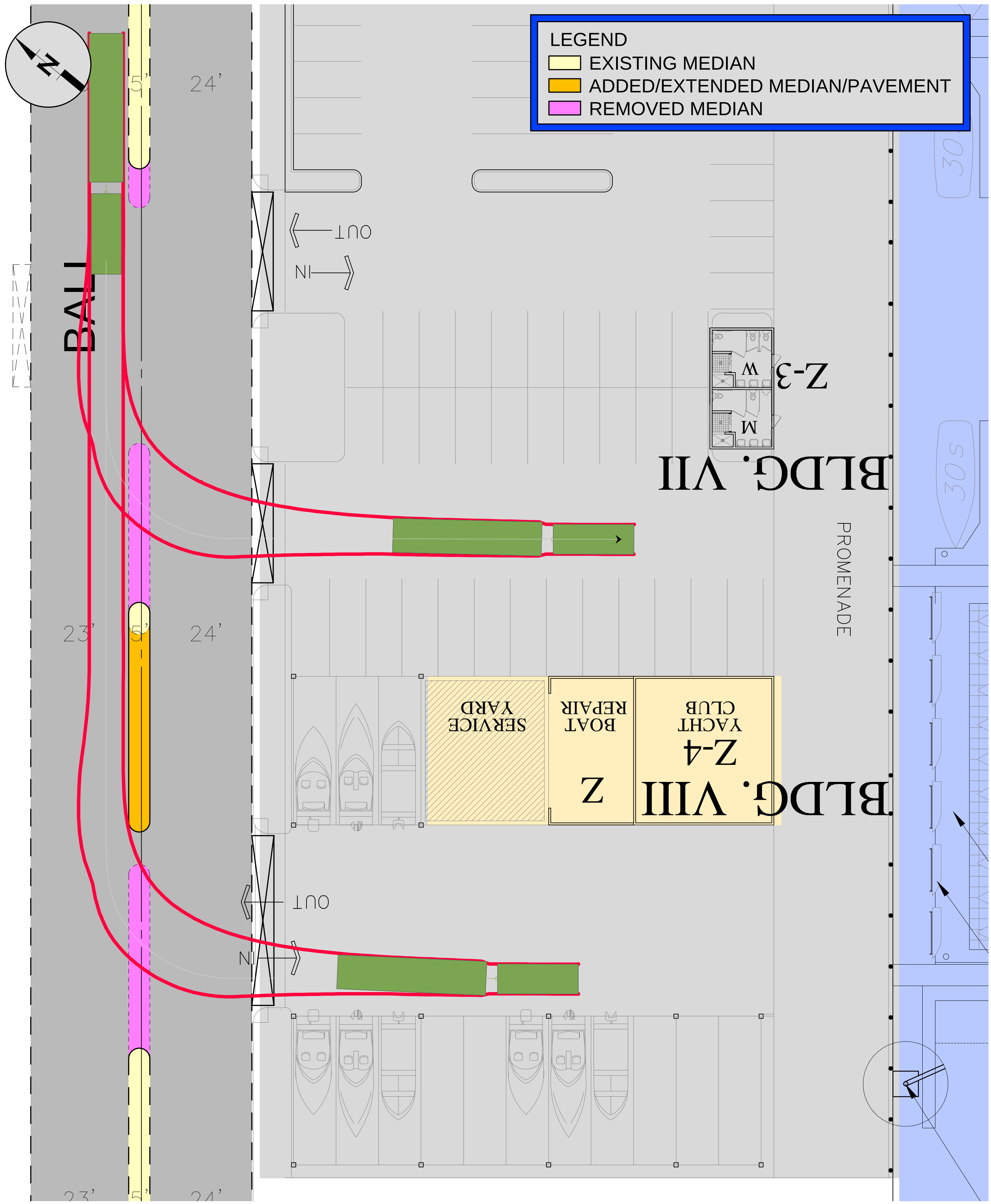



FIGURE D-2(a)

10/15/2013

Hirsch/Green Transportation Consulting, Inc.

BALI WAY ACCESS FOR
35-FOOT BOAT AND TOW VEHICLE
ENTRANCE MANEUVER

PARCEL 44 \ IMP-CONCEPTUAL-1

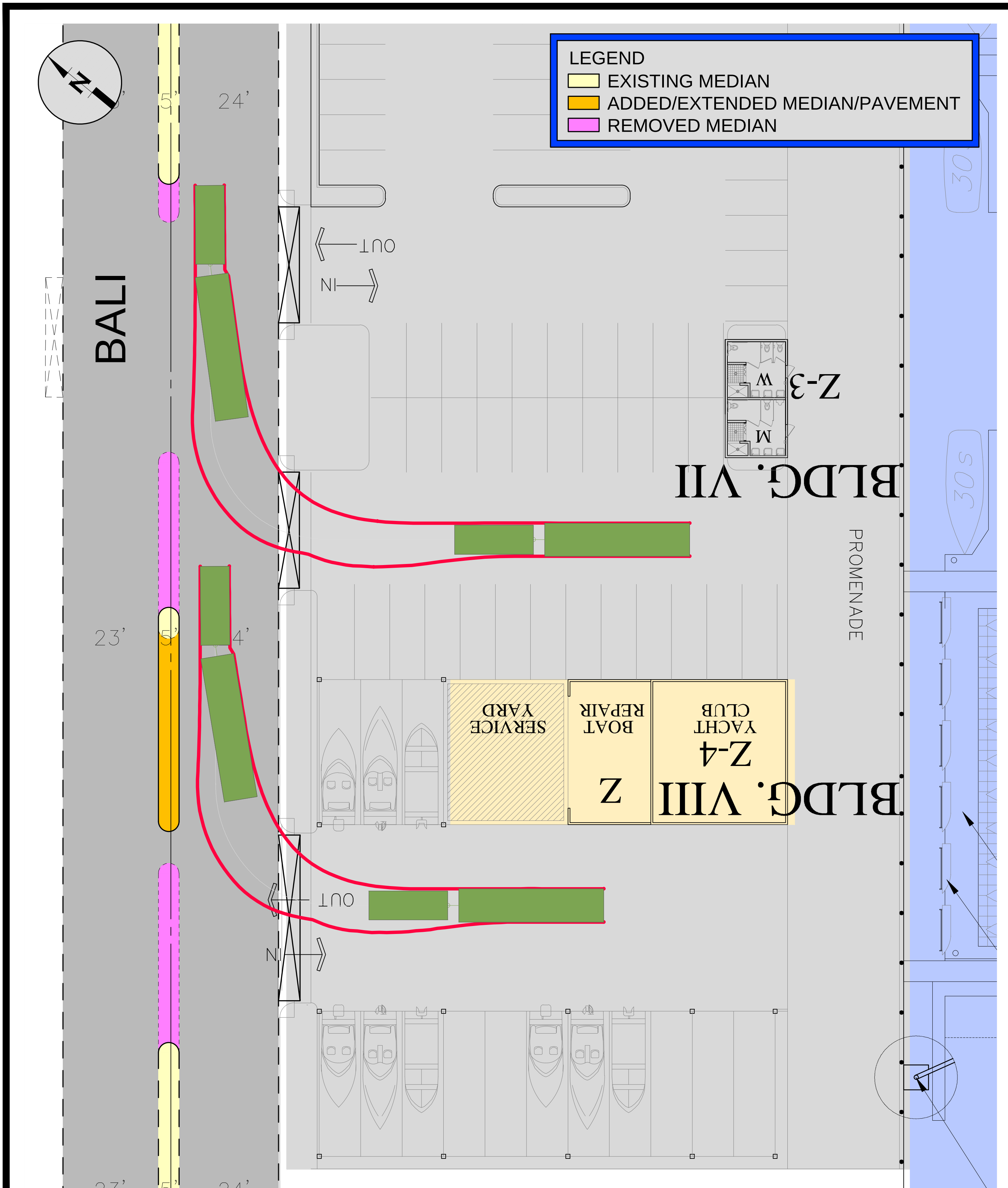



FIGURE D-2(b)

10/15/2013

BALI WAY ACCESS FOR
35-FOOT BOAT AND TOW VEHICLE
EXIT MANEUVER

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

# APPENDIX E

# RELATED PROJECTS TRIP GENERATION RATES/EQUATIONS

## Table E-1
## Related Projects Trip Generation Rates and Equations
## ITE 8th Edition Data (unless otherwise indicated)

Warehousing - per 1,000 gross square feet of floor area (ITE Land Use 150)

Daily Trips: T = 3.56 (A)
AM Peak Hour: T = 0.30 (A); I/B = 79%, O/B = 21%
PM Peak Hour: T = 0.32 (A); I/B = 25%. O/B = 75% (CTCSP "Storage" use; trip "splits" from ITE)

Apartment - per dwelling unit (ITE Land Use 220)

Daily Trips: T = 6.65 (U)
AM Peak Hour: T = 0.51 (U); I/B = 20%, O/B = 80%
PM Peak Hour: T = 0.70 (U); I/B = 65%. O/B = 35% (CTCSP; trip "splits" from ITE)

Single-Family Detached Housing - per dwelling unit (ITE Land Use 210)

Daily Trips: T = 9.57 (U)
AM Peak Hour: T = 0.75 (U); I/B = 25%, O/B = 75%
PM Peak Hour: T = 0.70 (U); I/B = 63%. O/B = 37% (CTCSP; trip "splits" from ITE)

Condominium/Townhome - per dwelling unit (ITE Land Use 230)

Daily Trips: T = 5.81 (U)
AM Peak Hour: T = 0.44 (U); I/B = 17%, O/B = 83%
PM Peak Hour: T = 0.70 (U); I/B = 67%. O/B = 33% (CTCSP; trip "splits" from ITE)

Hotel - per room (ITE Land Use 310)

Daily Trips: T = 8.17 (R)
AM Peak Hour: T = 0.56 (R); I/B = 61%, O/B = 39%
PM Peak Hour: T = 0.70 (U); I/B = 53%. O/B = 47% (CTCSP; trip "splits" from ITE)

General Office - per 1,000 gross square feet of floor area (ITE Land Use 710)

Daily Trips: T = 11.01 (A)
AM Peak Hour: T = 1.55 (A); I/B = 88%, O/B = 12%
PM Peak Hour: T = 2.80 (A); I/B = 17%. O/B = 83% (CTCSP "Office < 100 KSF"; trip "splits" from ITE)

Specialty Retail Center - per 1,000 gross square feet of floor area (ITE Land Use 814)

Daily Trips: T = 44.32 (A)
AM Peak Hour: T = 1.33 (A); I/B = 60%, O/B = 40% (SanDAG)
PM Peak Hour: T = 5.00 (A); I/B = 44%. O/B = 56% (CTCSP; trip "splits" from ITE)

Shopping Center - per 1,000 gross square feet of floor area (ITE Land Use 820)

Daily Trips: T = 42.94 (A)
AM Peak Hour: T = 1.00 (A); I/B = 61%, O/B = 39%
PM Peak Hour: T = 3.73 (A); I/B = 49%. O/B = 51%

Supermarket - per 1,000 gross square feet of floor area (ITE Land Use 850)

Daily Trips: T = 102.24 (A)
AM Peak Hour: T = 3.59 (A); I/B = 61%, O/B = 39%
PM Peak Hour: T = 8.80 (A); I/B = 51%. O/B = 49% (CTCSP; trip "splits" from ITE)

**Table E-1 (continued)**
**Related Projects Trip Generation Rates and Equations**
**ITE 8th Edition Data (unless otherwise indicated)**

Pharmacy/Drugstore - per 1,000 gross square feet of floor area (ITE Land Use 880)

| | |
|---|---|
| Daily Trips: | T = 90.06 (A) |
| AM Peak Hour: | T = 3.209 (A); I/B = 59%, O/B = 41% |
| PM Peak Hour: | T = 8.42 (A); I/B = 50%. O/B = 50% |

High-Turnover (Sit-Down) Restaurant - per 1,000 gross square feet of floor area (ITE Land Use 932)

| | |
|---|---|
| Daily Trips: | T = 127.15 (A) |
| AM Peak Hour: | T = 11.52 (A); I/B = 52%, O/B = 48% |
| PM Peak Hour: | T = 10.50 (A); I/B = 61%. O/B = 39% (CTCSP; trip "splits" from ITE) |

Where: T = Trip Ends; I/B = Inbound Trip Percentage
A = Building Area in 1,000 sq. ft.; O/B = Outbound Trip Percentage
U = Dwelling Units
R = Room

## APPENDIX F

## INTERSECTION GEOMETRICS/CONTROLS AND TRAFFIC COUNT DATA SHEETS

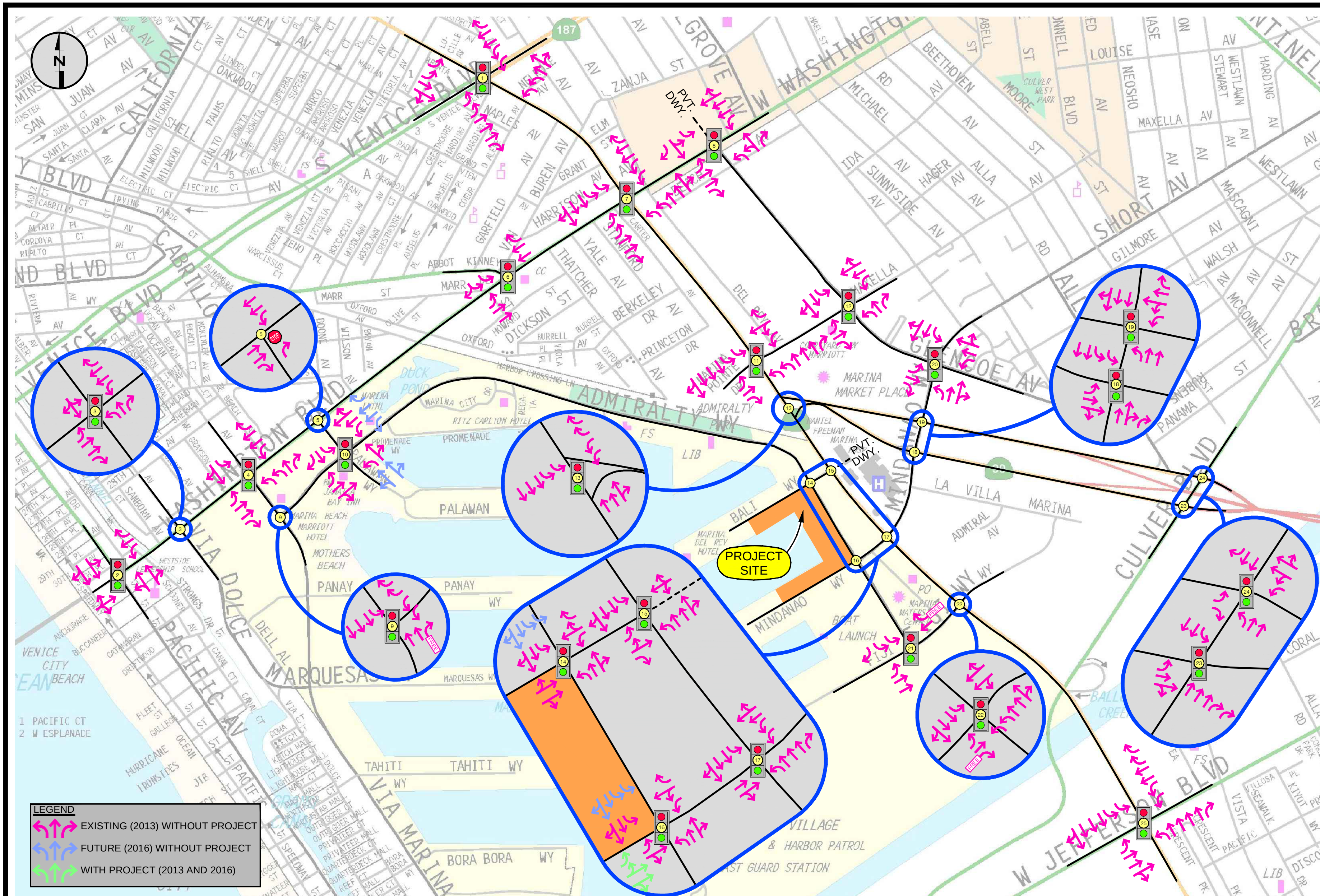
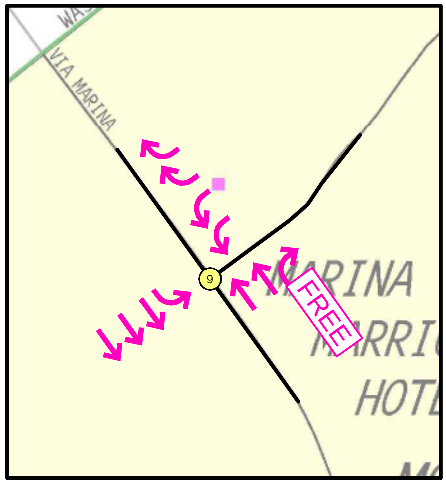



FIGURE F-1

EXISTING AND FUTURE (WITHOUT MITIGATION)
STUDY INTERSECTION LANE CONFIGURATIONS AND CONTROLS

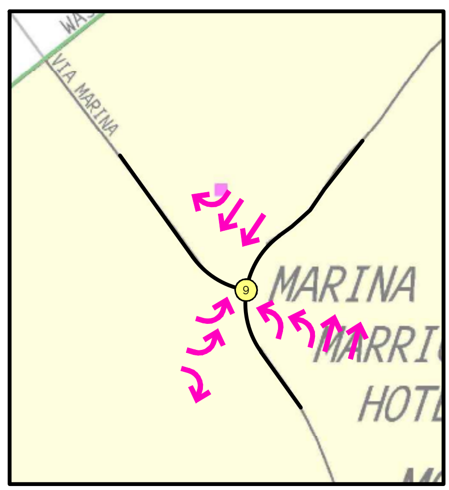
HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

PARCEL 44 \ MIT-CUMULATIVE-INT-9




EXISTING


WITH LUP
INTERSECTION
IMPROVEMENTS
ALTERNATIVE "A"




WITH LUP
INTERSECTION
IMPROVEMENTS
ALTERNATIVE "B"

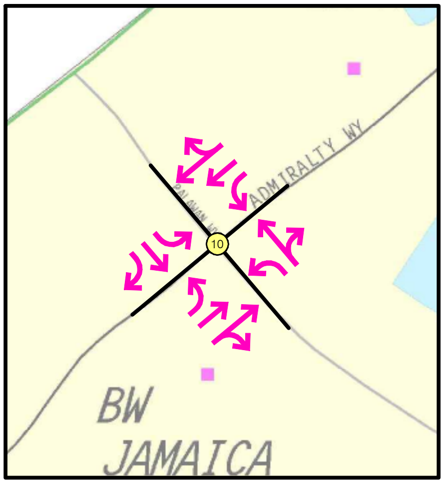
FIGURE F-2(a)

10/23/2013

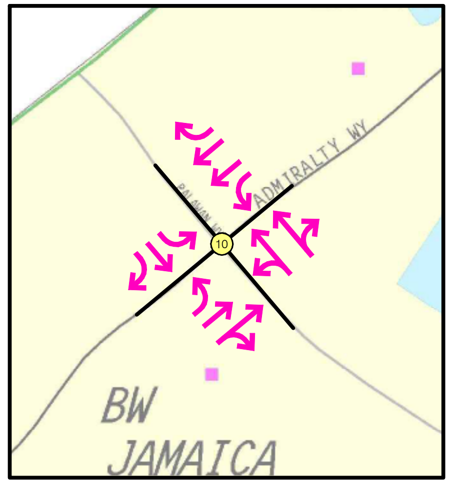
HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

CUMULATIVE MITIGATION
INTERSECTION LANE CONFIGURATIONS
(LOS ANGELES COUNTY ONLY)
ADMIRALTY WAY / VIA MARINA

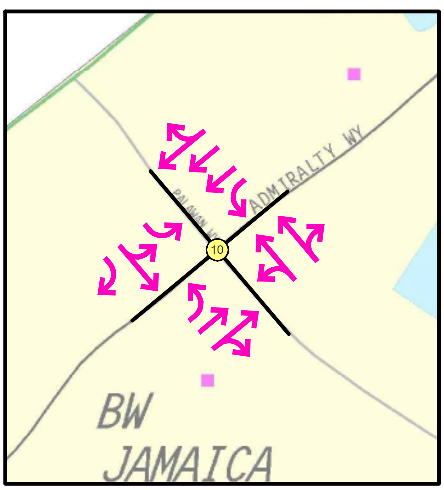
PARCEL 44 \ MIT-CUMULATIVE-INT-10



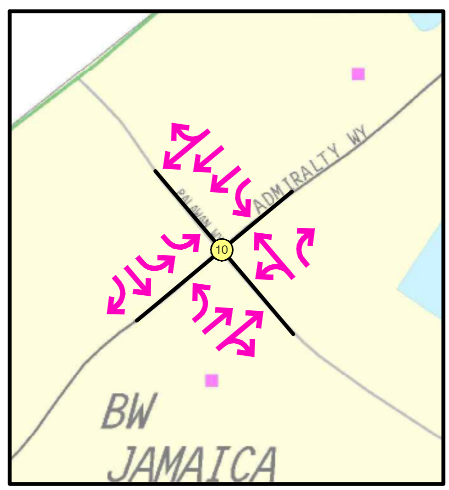

EXISTING




FUTURE




WITH LUP
INTERSECTION
IMPROVEMENTS
ALTERNATIVE "A"




WITH LUP
INTERSECTION
IMPROVEMENTS
ALTERNATIVE "B"

10/23/2013

FIGURE F-2(b)

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.

CUMULATIVE MITIGATION
INTERSECTION LANE CONFIGURATIONS
(LOS ANGELES COUNTY ONLY)
ADMIRALTY WAY / PALAWAN WAY


EXISTING


FUTURE WITH PROJECT
(INCLUDES PARTIAL
LUP IMPROVEMENTS)


WITH FULL LUP
INTERSECTION
IMPROVEMENTS

FIGURE F-2(c)

CUMULATIVE MITIGATION
INTERSECTION LANE CONFIGURATIONS
(LOS ANGELES COUNTY ONLY)
ADMIRALTY WAY / MINDANAO WAY

10/23/2013

HIRSCH
GREEN
Hirsch/Green Transportation Consulting, Inc.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

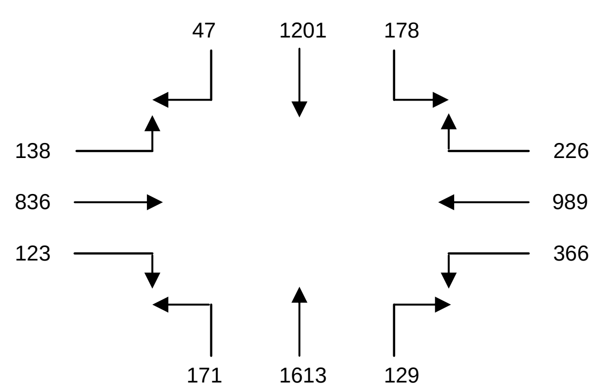
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S LINCOLN BOULEVARD
E/W VENICE BOULEVARD
FILE NUMBER: 1-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 11 | 130 | 18 | 50 | 102 | 33 | 27 | 324 | 12 | 14 | 95 | 8 |
| 0715-0730 | 16 | 156 | 26 | 60 | 125 | 48 | 35 | 370 | 23 | 13 | 100 | 10 |
| 0730-0745 | 11 | 177 | 29 | 61 | 155 | 53 | 44 | 403 | 32 | 23 | 133 | 13 |
| 0745-0800 | 9 | 208 | 39 | 75 | 223 | 82 | 30 | 458 | 42 | 24 | 154 | 26 |
| 0800-0815 | 10 | 237 | 30 | 64 | 217 | 74 | 34 | 423 | 30 | 33 | 205 | 39 |
| 0815-0830 | 12 | 284 | 35 | 53 | 206 | 113 | 33 | 442 | 38 | 24 | 216 | 30 |
| 0830-0845 | 10 | 311 | 48 | 61 | 262 | 99 | 28 | 408 | 42 | 33 | 224 | 37 |
| 0845-0900 | 11 | 299 | 47 | 55 | 261 | 83 | 37 | 377 | 44 | 38 | 201 | 31 |
| 0900-0915 | 14 | 307 | 48 | 57 | 260 | 71 | 31 | 386 | 47 | 28 | 195 | 40 |
| 0915-0930 | 19 | 303 | 49 | 56 | 205 | 70 | 27 | 393 | 52 | 32 | 152 | 33 |
| 0930-0945 | 19 | 285 | 37 | 63 | 222 | 58 | 32 | 342 | 39 | 26 | 175 | 37 |
| 0945-1000 | 21 | 257 | 44 | 67 | 202 | 50 | 28 | 302 | 35 | 35 | 158 | 35 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 47 | 671 | 112 | 246 | 605 | 216 | 136 | 1555 | 109 | 74 | 482 | 57 | 4310 |
| 0715-0815 | 46 | 778 | 124 | 260 | 720 | 257 | 143 | 1654 | 127 | 93 | 592 | 88 | 4882 |
| 0730-0830 | 42 | 906 | 133 | 253 | 801 | 322 | 141 | 1726 | 142 | 104 | 708 | 108 | 5386 |
| 0745-0845 | 41 | 1040 | 152 | 253 | 908 | 368 | 125 | 1731 | 152 | 114 | 799 | 132 | 5815 |
| 0800-0900 | 43 | 1131 | 160 | 233 | 946 | 369 | 132 | 1650 | 154 | 128 | 846 | 137 | 5929 |
| 0815-0915 | 47 | 1201 | 178 | 226 | 989 | 366 | 129 | 1613 | 171 | 123 | 836 | 138 | 6017 |
| 0830-0930 | 54 | 1220 | 192 | 229 | 988 | 323 | 123 | 1564 | 185 | 131 | 772 | 141 | 5922 |
| 0845-0945 | 63 | 1194 | 181 | 231 | 948 | 282 | 127 | 1498 | 182 | 124 | 723 | 141 | 5694 |
| 0900-1000 | 73 | 1152 | 178 | 243 | 889 | 249 | 118 | 1423 | 173 | 121 | 680 | 145 | 5444 |

A.M. PEAK HOUR
0815-0915

VENICE BOULEVARD




LINCOLN BOULEVARD


DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877

.

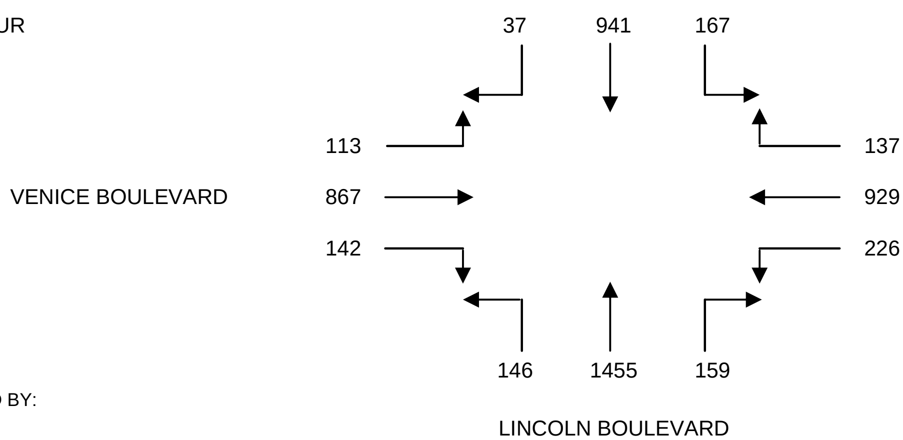
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S LINCOLN BOULEVARD
E/W VENICE BOULEVARD
FILE NUMBER: 1-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 10 | 236 | 27 | 26 | 160 | 40 | 20 | 290 | 26 | 35 | 147 | 33 |
| 0415-0430 | 10 | 219 | 38 | 44 | 209 | 61 | 34 | 332 | 39 | 39 | 195 | 39 |
| 0430-0445 | 11 | 220 | 22 | 48 | 249 | 58 | 35 | 385 | 44 | 49 | 223 | 24 |
| 0445-0500 | 7 | 242 | 44 | 46 | 200 | 51 | 35 | 321 | 30 | 38 | 207 | 30 |
| 0500-0515 | 12 | 238 | 43 | 36 | 201 | 45 | 49 | 375 | 35 | 41 | 206 | 36 |
| 0515-0530 | 10 | 235 | 45 | 37 | 221 | 52 | 33 | 348 | 36 | 32 | 204 | 31 |
| 0530-0545 | 7 | 241 | 33 | 30 | 246 | 72 | 39 | 372 | 34 | 31 | 242 | 24 |
| 0545-0600 | 8 | 227 | 46 | 34 | 261 | 57 | 38 | 360 | 41 | 38 | 215 | 22 |
| 0600-0615 | 11 | 238 | 44 | 31 | 224 | 65 | 30 | 344 | 38 | 42 | 200 | 24 |
| 0615-0630 | 10 | 206 | 55 | 39 | 231 | 46 | 37 | 351 | 44 | 47 | 213 | 24 |
| 0630-0645 | 9 | 200 | 43 | 33 | 212 | 69 | 44 | 337 | 36 | 36 | 182 | 19 |
| 0645-0700 | 8 | 216 | 28 | 30 | 232 | 80 | 34 | 357 | 45 | 23 | 153 | 24 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 38 | 917 | 131 | 164 | 818 | 210 | 124 | 1328 | 139 | 161 | 772 | 126 | 4928 |
| 0415-0515 | 40 | 919 | 147 | 174 | 859 | 215 | 153 | 1413 | 148 | 167 | 831 | 129 | 5195 |
| 0430-0530 | 40 | 935 | 154 | 167 | 871 | 206 | 152 | 1429 | 145 | 160 | 840 | 121 | 5220 |
| 0445-0545 | 36 | 956 | 165 | 149 | 868 | 220 | 156 | 1416 | 135 | 142 | 859 | 121 | 5223 |
| 0500-0600 | 37 | 941 | 167 | 137 | 929 | 226 | 159 | 1455 | 146 | 142 | 867 | 113 | 5319 |
| 0515-0615 | 36 | 941 | 168 | 132 | 952 | 246 | 140 | 1424 | 149 | 143 | 861 | 101 | 5293 |
| 0530-0630 | 36 | 912 | 178 | 134 | 962 | 240 | 144 | 1427 | 157 | 158 | 870 | 94 | 5312 |
| 0545-0645 | 38 | 871 | 188 | 137 | 928 | 237 | 149 | 1392 | 159 | 163 | 810 | 89 | 5161 |
| 0600-0700 | 38 | 860 | 170 | 133 | 899 | 260 | 145 | 1389 | 163 | 148 | 748 | 91 | 5044 |

P.M. PEAK HOUR
0500-0600




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

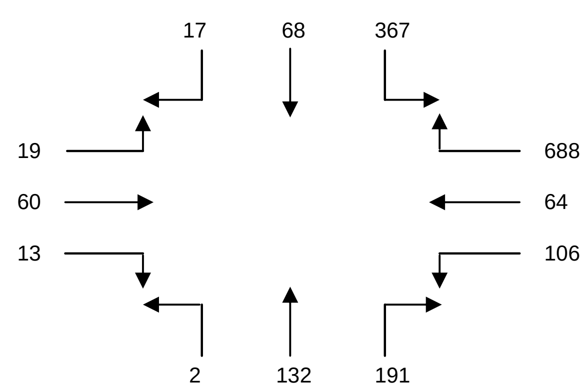
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | WEDNESDAY, DECEMBER 7, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | PACIFIC AVENUE |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 2-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 5 | 11 | 42 | 107 | 7 | 13 | 17 | 19 | 1 | 1 | 12 | 5 |
| 0715-0730 | 4 | 11 | 59 | 136 | 9 | 15 | 21 | 21 | 1 | 2 | 8 | 2 |
| 0730-0745 | 8 | 14 | 51 | 158 | 10 | 19 | 27 | 30 | 3 | 3 | 11 | 6 |
| 0745-0800 | 5 | 16 | 81 | 164 | 14 | 29 | 49 | 47 | 0 | 5 | 13 | 3 |
| 0800-0815 | 6 | 19 | 83 | 188 | 16 | 26 | 50 | 32 | 0 | 4 | 18 | 5 |
| 0815-0830 | 5 | 16 | 83 | 173 | 22 | 28 | 40 | 30 | 0 | 2 | 13 | 4 |
| 0830-0845 | 2 | 19 | 99 | 160 | 15 | 20 | 48 | 30 | 1 | 5 | 14 | 3 |
| 0845-0900 | 4 | 14 | 102 | 167 | 11 | 32 | 53 | 40 | 1 | 2 | 15 | 7 |
| 0900-0915 | 4 | 19 | 92 | 157 | 10 | 29 | 51 | 25 | 0 | 1 | 14 | 5 |
| 0915-0930 | 3 | 18 | 81 | 152 | 11 | 33 | 47 | 37 | 2 | 3 | 13 | 2 |
| 0930-0945 | 5 | 18 | 64 | 149 | 16 | 24 | 42 | 32 | 1 | 2 | 15 | 5 |
| 0945-1000 | 9 | 19 | 74 | 118 | 10 | 35 | 39 | 29 | 1 | 0 | 16 | 3 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 22 | 52 | 233 | 565 | 40 | 76 | 114 | 117 | 5 | 11 | 44 | 16 | 1295 |
| 0715-0815 | 23 | 60 | 274 | 646 | 49 | 89 | 147 | 130 | 4 | 14 | 50 | 16 | 1502 |
| 0730-0830 | 24 | 65 | 298 | 683 | 62 | 102 | 166 | 139 | 3 | 14 | 55 | 18 | 1629 |
| 0745-0845 | 18 | 70 | 346 | 685 | 67 | 103 | 187 | 139 | 1 | 16 | 58 | 15 | 1705 |
| 0800-0900 | 17 | 68 | 367 | 688 | 64 | 106 | 191 | 132 | 2 | 13 | 60 | 19 | 1727 |
| 0815-0915 | 15 | 68 | 376 | 657 | 58 | 109 | 192 | 125 | 2 | 10 | 56 | 19 | 1687 |
| 0830-0930 | 13 | 70 | 374 | 636 | 47 | 114 | 199 | 132 | 4 | 11 | 56 | 17 | 1673 |
| 0845-0945 | 16 | 69 | 339 | 625 | 48 | 118 | 193 | 134 | 4 | 8 | 57 | 19 | 1630 |
| 0900-1000 | 21 | 74 | 311 | 576 | 47 | 121 | 179 | 123 | 4 | 6 | 58 | 15 | 1535 |

A.M. PEAK HOUR
0800-0900

WASHINGTON BOULEVARD




PACIFIC AVENUE

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

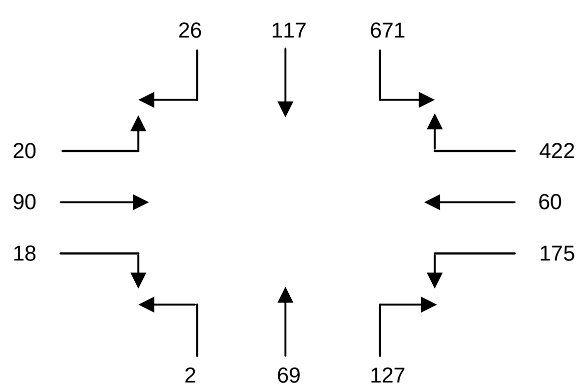
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: WEDNESDAY, DECEMBER 7, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S PACIFIC AVENUE
E/W WASHINGTON BOULEVARD
FILE NUMBER: 2-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 5 | 21 | 132 | 95 | 11 | 28 | 33 | 19 | 1 | 3 | 18 | 3 |
| 0415-0430 | 7 | 26 | 144 | 108 | 13 | 41 | 27 | 17 | 1 | 4 | 17 | 5 |
| 0430-0445 | 6 | 24 | 139 | 116 | 13 | 44 | 25 | 21 | 1 | 5 | 22 | 9 |
| 0445-0500 | 7 | 29 | 161 | 100 | 15 | 46 | 23 | 21 | 3 | 6 | 20 | 10 |
| 0500-0515 | 13 | 33 | 145 | 118 | 12 | 40 | 34 | 14 | 1 | 8 | 20 | 5 |
| 0515-0530 | 8 | 33 | 143 | 104 | 18 | 32 | 32 | 14 | 3 | 4 | 17 | 5 |
| 0530-0545 | 5 | 36 | 185 | 109 | 13 | 51 | 26 | 22 | 0 | 2 | 17 | 7 |
| 0545-0600 | 6 | 21 | 181 | 111 | 13 | 48 | 28 | 16 | 1 | 5 | 21 | 3 |
| 0600-0615 | 8 | 32 | 145 | 100 | 15 | 32 | 36 | 17 | 1 | 6 | 31 | 3 |
| 0615-0630 | 7 | 28 | 160 | 102 | 19 | 44 | 37 | 14 | 0 | 5 | 21 | 7 |
| 0630-0645 | 11 | 27 | 153 | 90 | 15 | 41 | 28 | 13 | 1 | 2 | 21 | 4 |
| 0645-0700 | 12 | 31 | 151 | 94 | 19 | 49 | 22 | 18 | 1 | 1 | 26 | 8 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 25 | 100 | 576 | 419 | 52 | 159 | 108 | 78 | 6 | 18 | 77 | 27 | 1645 |
| 0415-0515 | 33 | 112 | 589 | 442 | 53 | 171 | 109 | 73 | 6 | 23 | 79 | 29 | 1719 |
| 0430-0530 | 34 | 119 | 588 | 438 | 58 | 162 | 114 | 70 | 8 | 23 | 79 | 29 | 1722 |
| 0445-0545 | 33 | 131 | 634 | 431 | 58 | 169 | 115 | 71 | 7 | 20 | 74 | 27 | 1770 |
| 0500-0600 | 32 | 123 | 654 | 442 | 56 | 171 | 120 | 66 | 5 | 19 | 75 | 20 | 1783 |
| 0515-0615 | 27 | 122 | 654 | 424 | 59 | 163 | 122 | 69 | 5 | 17 | 86 | 18 | 1766 |
| 0530-0630 | 26 | 117 | 671 | 422 | 60 | 175 | 127 | 69 | 2 | 18 | 90 | 20 | 1797 |
| 0545-0645 | 32 | 108 | 639 | 403 | 62 | 165 | 129 | 60 | 3 | 18 | 94 | 17 | 1730 |
| 0600-0700 | 38 | 118 | 609 | 386 | 68 | 166 | 123 | 62 | 3 | 14 | 99 | 22 | 1708 |

P.M. PEAK HOUR
0530-0630

WASHINGTON BOULEVARD




PACIFIC AVENUE


DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

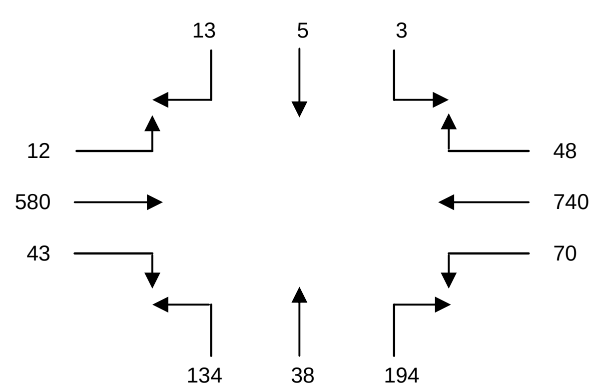
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: WEDNESDAY, DECEMBER 7, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S DELL AVENUE / VIA DOLCE
E/W WASHINGTON BOULEVARD
FILE NUMBER: 3-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 1 | 1 | 0 | 7 | 110 | 16 | 20 | 4 | 19 | 9 | 70 | 0 |
| 0715-0730 | 0 | 1 | 0 | 5 | 142 | 11 | 27 | 3 | 26 | 7 | 92 | 1 |
| 0730-0745 | 0 | 0 | 2 | 5 | 162 | 10 | 43 | 5 | 34 | 11 | 103 | 2 |
| 0745-0800 | 3 | 2 | 0 | 9 | 190 | 18 | 49 | 7 | 21 | 11 | 113 | 5 |
| 0800-0815 | 2 | 0 | 3 | 13 | 197 | 18 | 53 | 8 | 27 | 10 | 120 | 4 |
| 0815-0830 | 4 | 0 | 0 | 14 | 194 | 22 | 37 | 9 | 32 | 6 | 139 | 2 |
| 0830-0845 | 5 | 2 | 0 | 12 | 150 | 17 | 55 | 10 | 41 | 15 | 157 | 2 |
| 0845-0900 | 2 | 3 | 0 | 9 | 199 | 13 | 49 | 11 | 34 | 12 | 164 | 4 |
| 0900-0915 | 3 | 1 | 0 | 6 | 175 | 16 | 31 | 10 | 32 | 13 | 141 | 3 |
| 0915-0930 | 1 | 0 | 2 | 11 | 167 | 15 | 39 | 9 | 35 | 10 | 124 | 2 |
| 0930-0945 | 2 | 0 | 2 | 10 | 161 | 16 | 25 | 8 | 20 | 12 | 132 | 3 |
| 0945-1000 | 2 | 1 | 0 | 8 | 145 | 17 | 22 | 6 | 12 | 9 | 120 | 5 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 4 | 4 | 2 | 26 | 604 | 55 | 139 | 19 | 100 | 38 | 378 | 8 | 1377 |
| 0715-0815 | 5 | 3 | 5 | 32 | 691 | 57 | 172 | 23 | 108 | 39 | 428 | 12 | 1575 |
| 0730-0830 | 9 | 2 | 5 | 41 | 743 | 68 | 182 | 29 | 114 | 38 | 475 | 13 | 1719 |
| 0745-0845 | 14 | 4 | 3 | 48 | 731 | 75 | 194 | 34 | 121 | 42 | 529 | 13 | 1808 |
| 0800-0900 | 13 | 5 | 3 | 48 | 740 | 70 | 194 | 38 | 134 | 43 | 580 | 12 | 1880 |
| 0815-0915 | 14 | 6 | 0 | 41 | 718 | 68 | 172 | 40 | 139 | 46 | 601 | 11 | 1856 |
| 0830-0930 | 11 | 6 | 2 | 38 | 691 | 61 | 174 | 40 | 142 | 50 | 586 | 11 | 1812 |
| 0845-0945 | 8 | 4 | 4 | 36 | 702 | 60 | 144 | 38 | 121 | 47 | 561 | 12 | 1737 |
| 0900-1000 | 8 | 2 | 4 | 35 | 648 | 64 | 117 | 33 | 99 | 44 | 517 | 13 | 1584 |

A.M. PEAK HOUR
0800-0900

WASHINGTON BOULEVARD




DELL AVENUE / VIA DOLCE

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

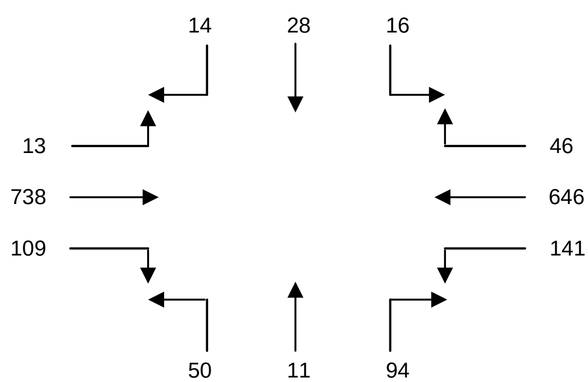
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: WEDNESDAY, DECEMBER 7, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S DELL AVENUE / VIA DOLCE
E/W WASHINGTON BOULEVARD
FILE NUMBER: 3-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 3 | 4 | 3 | 7 | 135 | 19 | 15 | 5 | 8 | 22 | 152 | 3 |
| 0415-0430 | 5 | 4 | 1 | 10 | 148 | 23 | 17 | 3 | 11 | 19 | 173 | 5 |
| 0430-0445 | 2 | 5 | 2 | 8 | 166 | 21 | 19 | 4 | 11 | 21 | 184 | 5 |
| 0445-0500 | 2 | 7 | 3 | 9 | 161 | 20 | 25 | 6 | 12 | 29 | 177 | 3 |
| 0500-0515 | 5 | 5 | 2 | 12 | 158 | 36 | 28 | 8 | 13 | 20 | 174 | 6 |
| 0515-0530 | 6 | 11 | 2 | 10 | 150 | 30 | 22 | 7 | 9 | 20 | 180 | 7 |
| 0530-0545 | 3 | 8 | 5 | 14 | 169 | 29 | 15 | 5 | 14 | 23 | 197 | 3 |
| 0545-0600 | 2 | 5 | 5 | 10 | 159 | 37 | 22 | 2 | 11 | 36 | 199 | 5 |
| 0600-0615 | 2 | 6 | 2 | 9 | 151 | 42 | 34 | 2 | 15 | 26 | 177 | 3 |
| 0615-0630 | 7 | 9 | 4 | 13 | 167 | 33 | 23 | 2 | 10 | 24 | 165 | 2 |
| 0630-0645 | 4 | 4 | 0 | 10 | 137 | 48 | 25 | 3 | 13 | 28 | 169 | 1 |
| 0645-0700 | 4 | 7 | 3 | 15 | 133 | 40 | 15 | 4 | 13 | 24 | 185 | 1 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 12 | 20 | 9 | 34 | 610 | 83 | 76 | 18 | 42 | 91 | 686 | 16 | 1697 |
| 0415-0515 | 14 | 21 | 8 | 39 | 633 | 100 | 89 | 21 | 47 | 89 | 708 | 19 | 1788 |
| 0430-0530 | 15 | 28 | 9 | 39 | 635 | 107 | 94 | 25 | 45 | 90 | 715 | 21 | 1823 |
| 0445-0545 | 16 | 31 | 12 | 45 | 638 | 115 | 90 | 26 | 48 | 92 | 728 | 19 | 1860 |
| 0500-0600 | 16 | 29 | 14 | 46 | 636 | 132 | 87 | 22 | 47 | 99 | 750 | 21 | 1899 |
| 0515-0615 | 13 | 30 | 14 | 43 | 629 | 138 | 93 | 16 | 49 | 105 | 753 | 18 | 1901 |
| 0530-0630 | 14 | 28 | 16 | 46 | 646 | 141 | 94 | 11 | 50 | 109 | 738 | 13 | 1906 |
| 0545-0645 | 15 | 24 | 11 | 42 | 614 | 160 | 104 | 9 | 49 | 114 | 710 | 11 | 1863 |
| 0600-0700 | 17 | 26 | 9 | 47 | 588 | 163 | 97 | 11 | 51 | 102 | 696 | 7 | 1814 |

P.M. PEAK HOUR
0530-0630

WASHINGTON BOULEVARD




DELL AVENUE / VIA DOLCE

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

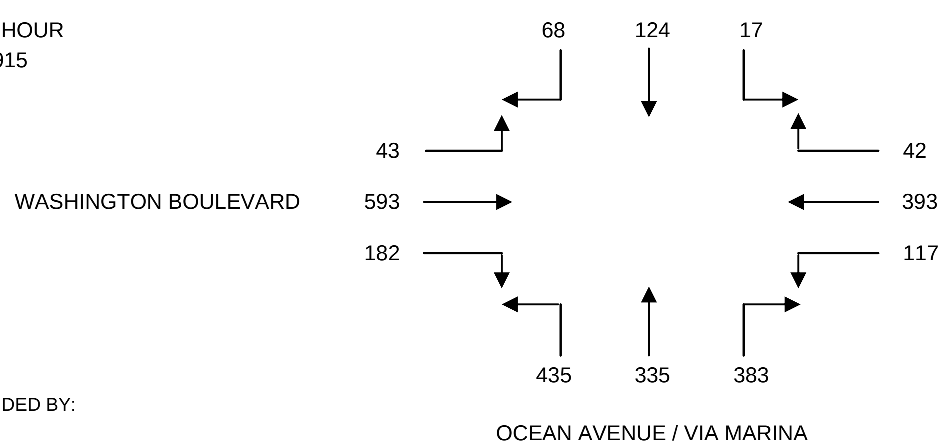
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 8, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | OCEAN AVENUE / VIA MARINA |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 4-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 10 | 8 | 4 | 8 | 60 | 23 | 67 | 50 | 59 | 17 | 61 | 7 |
| 0715-0730 | 9 | 10 | 3 | 5 | 64 | 22 | 72 | 58 | 74 | 23 | 70 | 8 |
| 0730-0745 | 7 | 20 | 3 | 7 | 84 | 30 | 74 | 98 | 100 | 24 | 85 | 9 |
| 0745-0800 | 10 | 22 | 2 | 5 | 81 | 27 | 101 | 88 | 97 | 32 | 135 | 15 |
| 0800-0815 | 14 | 27 | 4 | 7 | 110 | 25 | 104 | 83 | 106 | 35 | 116 | 12 |
| 0815-0830 | 19 | 31 | 5 | 9 | 92 | 39 | 80 | 85 | 119 | 57 | 154 | 11 |
| 0830-0845 | 14 | 37 | 3 | 7 | 102 | 21 | 112 | 82 | 105 | 43 | 141 | 11 |
| 0845-0900 | 17 | 30 | 6 | 13 | 96 | 29 | 91 | 90 | 111 | 42 | 157 | 11 |
| 0900-0915 | 18 | 26 | 3 | 13 | 103 | 28 | 100 | 78 | 100 | 40 | 141 | 10 |
| 0915-0930 | 16 | 24 | 5 | 9 | 95 | 27 | 98 | 83 | 79 | 44 | 137 | 10 |
| 0930-0945 | 18 | 24 | 7 | 5 | 91 | 23 | 93 | 85 | 83 | 49 | 102 | 9 |
| 0945-1000 | 20 | 32 | 7 | 6 | 88 | 23 | 137 | 68 | 65 | 32 | 100 | 7 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 36 | 60 | 12 | 25 | 289 | 102 | 314 | 294 | 330 | 96 | 351 | 39 | 1948 |
| 0715-0815 | 40 | 79 | 12 | 24 | 339 | 104 | 351 | 327 | 377 | 114 | 406 | 44 | 2217 |
| 0730-0830 | 50 | 100 | 14 | 28 | 367 | 121 | 359 | 354 | 422 | 148 | 490 | 47 | 2500 |
| 0745-0845 | 57 | 117 | 14 | 28 | 385 | 112 | 397 | 338 | 427 | 167 | 546 | 49 | 2637 |
| 0800-0900 | 64 | 125 | 18 | 36 | 400 | 114 | 387 | 340 | 441 | 177 | 568 | 45 | 2715 |
| 0815-0915 | 68 | 124 | 17 | 42 | 393 | 117 | 383 | 335 | 435 | 182 | 593 | 43 | 2732 |
| 0830-0930 | 65 | 117 | 17 | 42 | 396 | 105 | 401 | 333 | 395 | 169 | 576 | 42 | 2658 |
| 0845-0945 | 69 | 104 | 21 | 40 | 385 | 107 | 382 | 336 | 373 | 175 | 537 | 40 | 2569 |
| 0900-1000 | 72 | 106 | 22 | 33 | 377 | 101 | 428 | 314 | 327 | 165 | 480 | 36 | 2461 |

A.M. PEAK HOUR
0815-0915




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
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# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

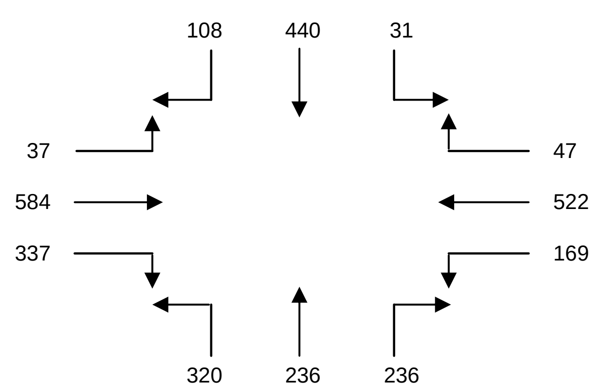
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 8, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | OCEAN AVENUE / VIA MARINA |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 4-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 28 | 83 | 5 | 11 | 115 | 33 | 54 | 59 | 49 | 69 | 131 | 9 |
| 0415-0430 | 27 | 97 | 9 | 15 | 97 | 39 | 58 | 62 | 74 | 90 | 144 | 6 |
| 0430-0445 | 31 | 88 | 12 | 10 | 106 | 37 | 60 | 62 | 79 | 80 | 143 | 12 |
| 0445-0500 | 25 | 88 | 8 | 6 | 115 | 27 | 54 | 53 | 63 | 75 | 152 | 5 |
| 0500-0515 | 23 | 98 | 12 | 13 | 129 | 30 | 56 | 46 | 61 | 75 | 136 | 4 |
| 0515-0530 | 30 | 109 | 7 | 13 | 127 | 43 | 79 | 79 | 74 | 85 | 122 | 7 |
| 0530-0545 | 29 | 108 | 5 | 11 | 127 | 45 | 56 | 56 | 88 | 79 | 147 | 9 |
| 0545-0600 | 28 | 112 | 11 | 15 | 129 | 43 | 58 | 58 | 72 | 72 | 163 | 11 |
| 0600-0615 | 25 | 110 | 5 | 11 | 134 | 37 | 52 | 52 | 69 | 83 | 137 | 7 |
| 0615-0630 | 26 | 110 | 10 | 10 | 132 | 44 | 70 | 70 | 91 | 103 | 137 | 10 |
| 0630-0645 | 22 | 92 | 8 | 7 | 135 | 46 | 68 | 68 | 83 | 94 | 120 | 6 |
| 0645-0700 | 28 | 98 | 9 | 6 | 121 | 45 | 54 | 54 | 70 | 83 | 135 | 6 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 111 | 356 | 34 | 42 | 433 | 136 | 226 | 236 | 265 | 314 | 570 | 32 | 2755 |
| 0415-0515 | 106 | 371 | 41 | 44 | 447 | 133 | 228 | 223 | 277 | 320 | 575 | 27 | 2792 |
| 0430-0530 | 109 | 383 | 39 | 42 | 477 | 137 | 249 | 240 | 277 | 315 | 553 | 28 | 2849 |
| 0445-0545 | 107 | 403 | 32 | 43 | 498 | 145 | 245 | 234 | 286 | 314 | 557 | 25 | 2889 |
| 0500-0600 | 110 | 427 | 35 | 52 | 512 | 161 | 249 | 239 | 295 | 311 | 568 | 31 | 2990 |
| 0515-0615 | 112 | 439 | 28 | 50 | 517 | 168 | 245 | 245 | 303 | 319 | 569 | 34 | 3029 |
| 0530-0630 | 108 | 440 | 31 | 47 | 522 | 169 | 236 | 236 | 320 | 337 | 584 | 37 | 3067 |
| 0545-0645 | 101 | 424 | 34 | 43 | 530 | 170 | 248 | 248 | 315 | 352 | 557 | 34 | 3056 |
| 0600-0700 | 101 | 410 | 32 | 34 | 522 | 172 | 244 | 244 | 313 | 363 | 529 | 29 | 2993 |

P.M. PEAK HOUR
0530-0630

WASHINGTON BOULEVARD




OCEAN AVENUE / VIA MARINA

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

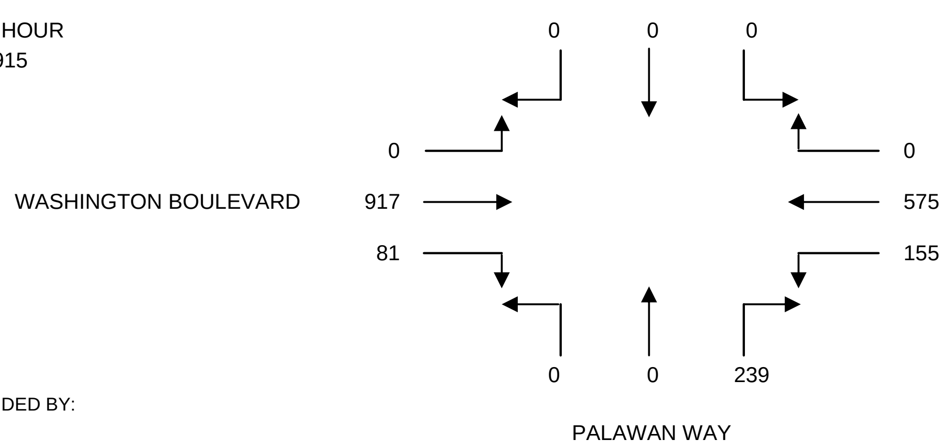
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 8, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | PALAWAN WAY |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 5-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 0 | 0 | 0 | 0 | 81 | 12 | 20 | 0 | 0 | 5 | 116 | 0 |
| 0715-0730 | 0 | 0 | 0 | 0 | 98 | 19 | 33 | 0 | 0 | 11 | 150 | 0 |
| 0730-0745 | 0 | 0 | 0 | 0 | 99 | 18 | 31 | 0 | 0 | 9 | 161 | 0 |
| 0745-0800 | 0 | 0 | 0 | 0 | 121 | 16 | 51 | 0 | 0 | 14 | 185 | 0 |
| 0800-0815 | 0 | 0 | 0 | 0 | 126 | 22 | 79 | 0 | 0 | 20 | 238 | 0 |
| 0815-0830 | 0 | 0 | 0 | 0 | 143 | 35 | 77 | 0 | 0 | 20 | 228 | 0 |
| 0830-0845 | 0 | 0 | 0 | 0 | 157 | 40 | 55 | 0 | 0 | 20 | 227 | 0 |
| 0845-0900 | 0 | 0 | 0 | 0 | 138 | 41 | 50 | 0 | 0 | 20 | 229 | 0 |
| 0900-0915 | 0 | 0 | 0 | 0 | 137 | 39 | 57 | 0 | 0 | 21 | 233 | 0 |
| 0915-0930 | 0 | 0 | 0 | 0 | 132 | 26 | 52 | 0 | 0 | 24 | 208 | 0 |
| 0930-0945 | 0 | 0 | 0 | 0 | 138 | 37 | 53 | 0 | 0 | 22 | 203 | 0 |
| 0945-1000 | 0 | 0 | 0 | 0 | 115 | 27 | 42 | 0 | 0 | 20 | 175 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 0 | 0 | 0 | 0 | 399 | 65 | 135 | 0 | 0 | 39 | 612 | 0 | 1250 |
| 0715-0815 | 0 | 0 | 0 | 0 | 444 | 75 | 194 | 0 | 0 | 54 | 734 | 0 | 1501 |
| 0730-0830 | 0 | 0 | 0 | 0 | 489 | 91 | 238 | 0 | 0 | 63 | 812 | 0 | 1693 |
| 0745-0845 | 0 | 0 | 0 | 0 | 547 | 113 | 262 | 0 | 0 | 74 | 878 | 0 | 1874 |
| 0800-0900 | 0 | 0 | 0 | 0 | 564 | 138 | 261 | 0 | 0 | 80 | 922 | 0 | 1965 |
| 0815-0915 | 0 | 0 | 0 | 0 | 575 | 155 | 239 | 0 | 0 | 81 | 917 | 0 | 1967 |
| 0830-0930 | 0 | 0 | 0 | 0 | 564 | 146 | 214 | 0 | 0 | 85 | 897 | 0 | 1906 |
| 0845-0945 | 0 | 0 | 0 | 0 | 545 | 143 | 212 | 0 | 0 | 87 | 873 | 0 | 1860 |
| 0900-1000 | 0 | 0 | 0 | 0 | 522 | 129 | 204 | 0 | 0 | 87 | 819 | 0 | 1761 |

A.M. PEAK HOUR
0815-0915




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
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# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

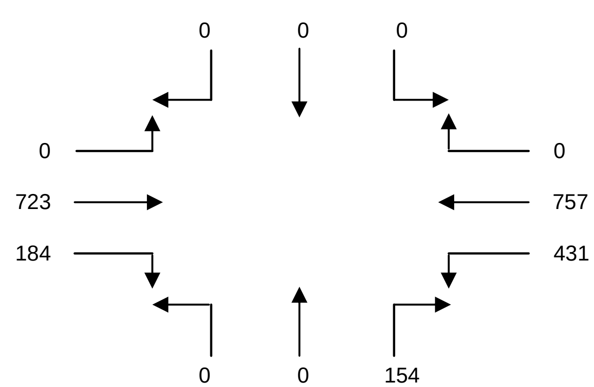
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 8, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | PALAWAN WAY |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 5-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 0 | 0 | 0 | 0 | 140 | 57 | 31 | 0 | 0 | 41 | 186 | 0 |
| 0415-0430 | 0 | 0 | 0 | 0 | 168 | 63 | 49 | 0 | 0 | 30 | 192 | 0 |
| 0430-0445 | 0 | 0 | 0 | 0 | 167 | 70 | 30 | 0 | 0 | 43 | 187 | 0 |
| 0445-0500 | 0 | 0 | 0 | 0 | 165 | 81 | 28 | 0 | 0 | 30 | 182 | 0 |
| 0500-0515 | 0 | 0 | 0 | 0 | 149 | 60 | 33 | 0 | 0 | 36 | 167 | 0 |
| 0515-0530 | 0 | 0 | 0 | 0 | 176 | 74 | 40 | 0 | 0 | 43 | 198 | 0 |
| 0530-0545 | 0 | 0 | 0 | 0 | 201 | 118 | 46 | 0 | 0 | 50 | 199 | 0 |
| 0545-0600 | 0 | 0 | 0 | 0 | 179 | 109 | 42 | 0 | 0 | 48 | 164 | 0 |
| 0600-0615 | 0 | 0 | 0 | 0 | 186 | 103 | 37 | 0 | 0 | 46 | 165 | 0 |
| 0615-0630 | 0 | 0 | 0 | 0 | 191 | 101 | 29 | 0 | 0 | 40 | 195 | 0 |
| 0630-0645 | 0 | 0 | 0 | 0 | 200 | 105 | 31 | 0 | 0 | 42 | 176 | 0 |
| 0645-0700 | 0 | 0 | 0 | 0 | 194 | 98 | 31 | 0 | 0 | 43 | 135 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 0 | 0 | 0 | 0 | 640 | 271 | 138 | 0 | 0 | 144 | 747 | 0 | 1940 |
| 0415-0515 | 0 | 0 | 0 | 0 | 649 | 274 | 140 | 0 | 0 | 139 | 728 | 0 | 1930 |
| 0430-0530 | 0 | 0 | 0 | 0 | 657 | 285 | 131 | 0 | 0 | 152 | 734 | 0 | 1959 |
| 0445-0545 | 0 | 0 | 0 | 0 | 691 | 333 | 147 | 0 | 0 | 159 | 746 | 0 | 2076 |
| 0500-0600 | 0 | 0 | 0 | 0 | 705 | 361 | 161 | 0 | 0 | 177 | 728 | 0 | 2132 |
| 0515-0615 | 0 | 0 | 0 | 0 | 742 | 404 | 165 | 0 | 0 | 187 | 726 | 0 | 2224 |
| 0530-0630 | 0 | 0 | 0 | 0 | 757 | 431 | 154 | 0 | 0 | 184 | 723 | 0 | 2249 |
| 0545-0645 | 0 | 0 | 0 | 0 | 756 | 418 | 139 | 0 | 0 | 176 | 700 | 0 | 2189 |
| 0600-0700 | 0 | 0 | 0 | 0 | 771 | 407 | 128 | 0 | 0 | 171 | 671 | 0 | 2148 |

P.M. PEAK HOUR
0530-0630

WASHINGTON BOULEVARD




PALAWAN WAY

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

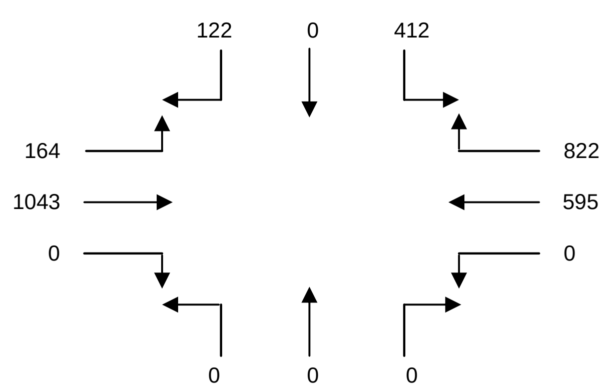
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | WEDNESDAY, DECEMBER 14, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | ABBOT KINNEY BOULEVARD |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 6-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 14 | 0 | 24 | 82 | 103 | 0 | 0 | 0 | 0 | 0 | 125 | 13 |
| 0715-0730 | 11 | 0 | 43 | 90 | 91 | 0 | 0 | 0 | 0 | 0 | 161 | 21 |
| 0730-0745 | 10 | 0 | 66 | 117 | 106 | 0 | 0 | 0 | 0 | 0 | 179 | 23 |
| 0745-0800 | 15 | 0 | 70 | 148 | 123 | 0 | 0 | 0 | 0 | 0 | 212 | 42 |
| 0800-0815 | 20 | 0 | 82 | 181 | 144 | 0 | 0 | 0 | 0 | 0 | 263 | 47 |
| 0815-0830 | 34 | 0 | 119 | 232 | 118 | 0 | 0 | 0 | 0 | 0 | 292 | 40 |
| 0830-0845 | 35 | 0 | 92 | 200 | 150 | 0 | 0 | 0 | 0 | 0 | 220 | 41 |
| 0845-0900 | 31 | 0 | 83 | 202 | 177 | 0 | 0 | 0 | 0 | 0 | 281 | 36 |
| 0900-0915 | 22 | 0 | 118 | 188 | 150 | 0 | 0 | 0 | 0 | 0 | 250 | 47 |
| 0915-0930 | 25 | 0 | 78 | 176 | 148 | 0 | 0 | 0 | 0 | 0 | 242 | 40 |
| 0930-0945 | 21 | 0 | 75 | 174 | 144 | 0 | 0 | 0 | 0 | 0 | 241 | 37 |
| 0945-1000 | 22 | 0 | 70 | 122 | 134 | 0 | 0 | 0 | 0 | 0 | 224 | 28 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 50 | 0 | 203 | 437 | 423 | 0 | 0 | 0 | 0 | 0 | 677 | 99 | 1889 |
| 0715-0815 | 56 | 0 | 261 | 536 | 464 | 0 | 0 | 0 | 0 | 0 | 815 | 133 | 2265 |
| 0730-0830 | 79 | 0 | 337 | 678 | 491 | 0 | 0 | 0 | 0 | 0 | 946 | 152 | 2683 |
| 0745-0845 | 104 | 0 | 363 | 761 | 535 | 0 | 0 | 0 | 0 | 0 | 987 | 170 | 2920 |
| 0800-0900 | 120 | 0 | 376 | 815 | 589 | 0 | 0 | 0 | 0 | 0 | 1056 | 164 | 3120 |
| 0815-0915 | 122 | 0 | 412 | 822 | 595 | 0 | 0 | 0 | 0 | 0 | 1043 | 164 | 3158 |
| 0830-0930 | 113 | 0 | 371 | 766 | 625 | 0 | 0 | 0 | 0 | 0 | 993 | 164 | 3032 |
| 0845-0945 | 99 | 0 | 354 | 740 | 619 | 0 | 0 | 0 | 0 | 0 | 1014 | 160 | 2986 |
| 0900-1000 | 90 | 0 | 341 | 660 | 576 | 0 | 0 | 0 | 0 | 0 | 957 | 152 | 2776 |

A.M. PEAK HOUR
0815-0915

WASHINGTON BOULEVARD




ABBOT KINNEY BOULEVARD

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

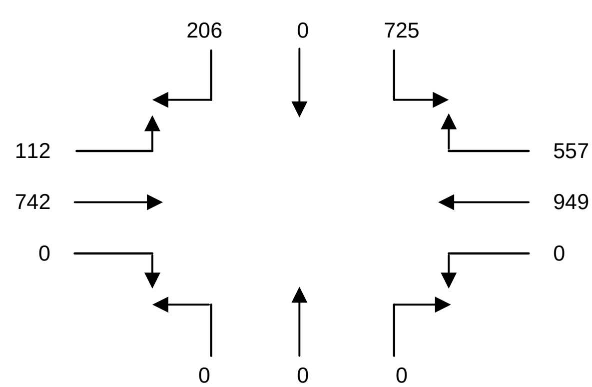
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: WEDNESDAY, DECEMBER 14, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S ABBOT KINNEY BOULEVARD
E/W WASHINGTON BOULEVARD
FILE NUMBER: 6-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 49 | 0 | 120 | 83 | 165 | 0 | 0 | 0 | 0 | 0 | 177 | 21 |
| 0415-0430 | 35 | 0 | 122 | 96 | 190 | 0 | 0 | 0 | 0 | 0 | 214 | 20 |
| 0430-0445 | 52 | 0 | 120 | 104 | 199 | 0 | 0 | 0 | 0 | 0 | 229 | 23 |
| 0445-0500 | 62 | 0 | 131 | 94 | 182 | 0 | 0 | 0 | 0 | 0 | 198 | 30 |
| 0500-0515 | 52 | 0 | 146 | 123 | 209 | 0 | 0 | 0 | 0 | 0 | 182 | 22 |
| 0515-0530 | 58 | 0 | 149 | 129 | 222 | 0 | 0 | 0 | 0 | 0 | 223 | 29 |
| 0530-0545 | 48 | 0 | 147 | 115 | 208 | 0 | 0 | 0 | 0 | 0 | 201 | 36 |
| 0545-0600 | 59 | 0 | 199 | 140 | 241 | 0 | 0 | 0 | 0 | 0 | 223 | 30 |
| 0600-0615 | 54 | 0 | 189 | 157 | 202 | 0 | 0 | 0 | 0 | 0 | 170 | 24 |
| 0615-0630 | 40 | 0 | 163 | 129 | 275 | 0 | 0 | 0 | 0 | 0 | 192 | 31 |
| 0630-0645 | 53 | 0 | 174 | 131 | 231 | 0 | 0 | 0 | 0 | 0 | 157 | 27 |
| 0645-0700 | 46 | 0 | 151 | 131 | 246 | 0 | 0 | 0 | 0 | 0 | 174 | 26 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 198 | 0 | 493 | 377 | 736 | 0 | 0 | 0 | 0 | 0 | 818 | 94 | 2716 |
| 0415-0515 | 201 | 0 | 519 | 417 | 780 | 0 | 0 | 0 | 0 | 0 | 823 | 95 | 2835 |
| 0430-0530 | 224 | 0 | 546 | 450 | 812 | 0 | 0 | 0 | 0 | 0 | 832 | 104 | 2968 |
| 0445-0545 | 220 | 0 | 573 | 461 | 821 | 0 | 0 | 0 | 0 | 0 | 804 | 117 | 2996 |
| 0500-0600 | 217 | 0 | 641 | 507 | 880 | 0 | 0 | 0 | 0 | 0 | 829 | 117 | 3191 |
| 0515-0615 | 219 | 0 | 684 | 541 | 873 | 0 | 0 | 0 | 0 | 0 | 817 | 119 | 3253 |
| 0530-0630 | 201 | 0 | 698 | 541 | 926 | 0 | 0 | 0 | 0 | 0 | 786 | 121 | 3273 |
| 0545-0645 | 206 | 0 | 725 | 557 | 949 | 0 | 0 | 0 | 0 | 0 | 742 | 112 | 3291 |
| 0600-0700 | 193 | 0 | 677 | 548 | 954 | 0 | 0 | 0 | 0 | 0 | 693 | 108 | 3173 |

P.M. PEAK HOUR
0545-0645

WASHINGTON BOULEVARD




ABBOT KINNEY BOULEVARD

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

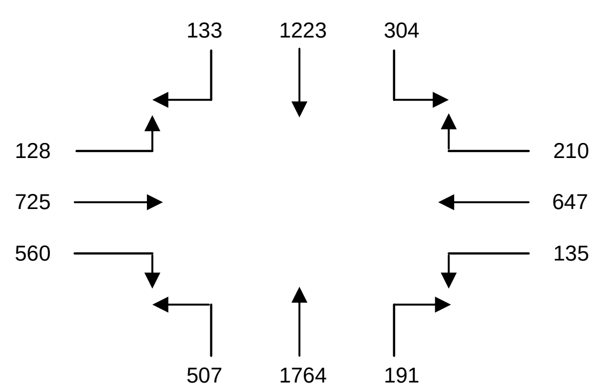
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 15, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | LINCOLN BOULEVARD |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 7-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 12 | 158 | 24 | 24 | 74 | 14 | 23 | 341 | 82 | 64 | 103 | 26 |
| 0715-0730 | 18 | 180 | 24 | 30 | 105 | 21 | 33 | 406 | 109 | 99 | 115 | 20 |
| 0730-0745 | 20 | 215 | 28 | 46 | 125 | 21 | 24 | 443 | 85 | 102 | 123 | 18 |
| 0745-0800 | 21 | 261 | 31 | 50 | 133 | 23 | 31 | 499 | 130 | 115 | 150 | 23 |
| 0800-0815 | 30 | 293 | 53 | 64 | 164 | 31 | 33 | 468 | 131 | 125 | 193 | 24 |
| 0815-0830 | 28 | 311 | 62 | 62 | 153 | 32 | 46 | 492 | 139 | 147 | 181 | 24 |
| 0830-0845 | 33 | 302 | 80 | 50 | 164 | 32 | 45 | 397 | 120 | 137 | 169 | 24 |
| 0845-0900 | 32 | 316 | 72 | 49 | 169 | 35 | 49 | 453 | 121 | 140 | 192 | 34 |
| 0900-0915 | 40 | 294 | 90 | 49 | 161 | 36 | 51 | 422 | 127 | 136 | 183 | 46 |
| 0915-0930 | 47 | 266 | 82 | 45 | 167 | 33 | 40 | 348 | 123 | 130 | 169 | 45 |
| 0930-0945 | 24 | 286 | 77 | 53 | 142 | 40 | 63 | 380 | 117 | 125 | 174 | 30 |
| 0945-1000 | 26 | 247 | 72 | 60 | 108 | 41 | 56 | 362 | 120 | 117 | 167 | 25 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 71 | 814 | 107 | 150 | 437 | 79 | 111 | 1689 | 406 | 380 | 491 | 87 | 4822 |
| 0715-0815 | 89 | 949 | 136 | 190 | 527 | 96 | 121 | 1816 | 455 | 441 | 581 | 85 | 5486 |
| 0730-0830 | 99 | 1080 | 174 | 222 | 575 | 107 | 134 | 1902 | 485 | 489 | 647 | 89 | 6003 |
| 0745-0845 | 112 | 1167 | 226 | 226 | 614 | 118 | 155 | 1856 | 520 | 524 | 693 | 95 | 6306 |
| 0800-0900 | 123 | 1222 | 267 | 225 | 650 | 130 | 173 | 1810 | 511 | 549 | 735 | 106 | 6501 |
| 0815-0915 | 133 | 1223 | 304 | 210 | 647 | 135 | 191 | 1764 | 507 | 560 | 725 | 128 | 6527 |
| 0830-0930 | 152 | 1178 | 324 | 193 | 661 | 136 | 185 | 1620 | 491 | 543 | 713 | 149 | 6345 |
| 0845-0945 | 143 | 1162 | 321 | 196 | 639 | 144 | 203 | 1603 | 488 | 531 | 718 | 155 | 6303 |
| 0900-1000 | 137 | 1093 | 321 | 207 | 578 | 150 | 210 | 1512 | 487 | 508 | 693 | 146 | 6042 |

A.M. PEAK HOUR
0815-0915

WASHINGTON BOULEVARD




LINCOLN BOULEVARD

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

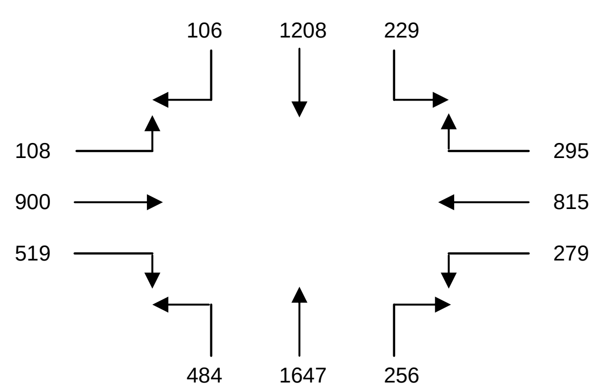
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 15, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | LINCOLN BOULEVARD |
| | E/W | WASHINGTON BOULEVRAD |
| FILE NUMBER: | | 7-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 20 | 291 | 73 | 85 | 132 | 62 | 49 | 385 | 104 | 102 | 147 | 35 |
| 0415-0430 | 25 | 320 | 72 | 89 | 160 | 63 | 62 | 360 | 109 | 125 | 212 | 40 |
| 0430-0445 | 33 | 264 | 57 | 74 | 169 | 75 | 68 | 375 | 124 | 127 | 206 | 33 |
| 0445-0500 | 24 | 325 | 56 | 89 | 173 | 68 | 81 | 386 | 122 | 131 | 201 | 34 |
| 0500-0515 | 27 | 322 | 65 | 79 | 167 | 71 | 77 | 422 | 117 | 123 | 188 | 30 |
| 0515-0530 | 22 | 311 | 60 | 70 | 189 | 75 | 66 | 393 | 129 | 138 | 227 | 35 |
| 0530-0545 | 31 | 286 | 48 | 72 | 173 | 66 | 73 | 416 | 120 | 130 | 203 | 24 |
| 0545-0600 | 25 | 298 | 64 | 88 | 205 | 59 | 59 | 425 | 131 | 132 | 247 | 35 |
| 0600-0615 | 26 | 288 | 57 | 67 | 213 | 69 | 58 | 417 | 118 | 124 | 222 | 29 |
| 0615-0630 | 24 | 336 | 60 | 68 | 224 | 85 | 66 | 389 | 115 | 133 | 228 | 20 |
| 0630-0645 | 27 | 291 | 49 | 81 | 215 | 82 | 61 | 350 | 122 | 121 | 210 | 28 |
| 0645-0700 | 27 | 302 | 57 | 73 | 223 | 70 | 55 | 396 | 121 | 126 | 190 | 24 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 102 | 1200 | 258 | 337 | 634 | 268 | 260 | 1506 | 459 | 485 | 766 | 142 | 6417 |
| 0415-0515 | 109 | 1231 | 250 | 331 | 669 | 277 | 288 | 1543 | 472 | 506 | 807 | 137 | 6620 |
| 0430-0530 | 106 | 1222 | 238 | 312 | 698 | 289 | 292 | 1576 | 492 | 519 | 822 | 132 | 6698 |
| 0445-0545 | 104 | 1244 | 229 | 310 | 702 | 280 | 297 | 1617 | 488 | 522 | 819 | 123 | 6735 |
| 0500-0600 | 105 | 1217 | 237 | 309 | 734 | 271 | 275 | 1656 | 497 | 523 | 865 | 124 | 6813 |
| 0515-0615 | 104 | 1183 | 229 | 297 | 780 | 269 | 256 | 1651 | 498 | 524 | 899 | 123 | 6813 |
| 0530-0630 | 106 | 1208 | 229 | 295 | 815 | 279 | 256 | 1647 | 484 | 519 | 900 | 108 | 6846 |
| 0545-0645 | 102 | 1213 | 230 | 304 | 857 | 295 | 244 | 1581 | 486 | 510 | 907 | 112 | 6841 |
| 0600-0700 | 104 | 1217 | 223 | 289 | 875 | 306 | 240 | 1552 | 476 | 504 | 850 | 101 | 6737 |

P.M. PEAK HOUR
0530-0630

WASHINGTON BOULEVRAD




LINCOLN BOULEVARD

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

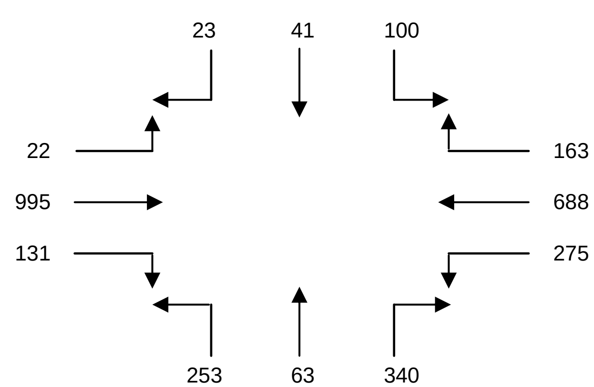
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | TUESDAY, DECEMBER 13, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | GLENCOE AVENUE |
| | E/W | WASHINGTON BOULEVARD |
| FILE NUMBER: | | 8-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 1 | 5 | 12 | 18 | 93 | 23 | 43 | 7 | 27 | 13 | 120 | 2 |
| 0715-0730 | 2 | 8 | 17 | 24 | 118 | 30 | 79 | 13 | 42 | 18 | 152 | 3 |
| 0730-0745 | 3 | 10 | 19 | 31 | 132 | 50 | 83 | 22 | 62 | 20 | 175 | 4 |
| 0745-0800 | 5 | 10 | 28 | 30 | 159 | 79 | 97 | 19 | 73 | 26 | 218 | 3 |
| 0800-0815 | 8 | 10 | 24 | 35 | 177 | 69 | 86 | 16 | 71 | 30 | 245 | 5 |
| 0815-0830 | 6 | 9 | 26 | 30 | 185 | 62 | 88 | 15 | 66 | 30 | 248 | 3 |
| 0830-0845 | 3 | 9 | 24 | 47 | 176 | 57 | 94 | 13 | 57 | 35 | 253 | 7 |
| 0845-0900 | 6 | 13 | 26 | 51 | 150 | 87 | 72 | 19 | 59 | 36 | 249 | 7 |
| 0900-0915 | 7 | 19 | 27 | 44 | 174 | 63 | 65 | 18 | 60 | 41 | 241 | 9 |
| 0915-0930 | 11 | 10 | 20 | 58 | 174 | 59 | 64 | 22 | 55 | 49 | 234 | 7 |
| 0930-0945 | 13 | 15 | 15 | 66 | 177 | 50 | 66 | 26 | 44 | 53 | 250 | 9 |
| 0945-1000 | 15 | 11 | 16 | 71 | 188 | 52 | 60 | 27 | 40 | 46 | 221 | 11 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 11 | 33 | 76 | 103 | 502 | 182 | 302 | 61 | 204 | 77 | 665 | 12 | 2228 |
| 0715-0815 | 18 | 38 | 88 | 120 | 586 | 228 | 345 | 70 | 248 | 94 | 790 | 15 | 2640 |
| 0730-0830 | 22 | 39 | 97 | 126 | 653 | 260 | 354 | 72 | 272 | 106 | 886 | 15 | 2902 |
| 0745-0845 | 22 | 38 | 102 | 142 | 697 | 267 | 365 | 63 | 267 | 121 | 964 | 18 | 3066 |
| 0800-0900 | 23 | 41 | 100 | 163 | 688 | 275 | 340 | 63 | 253 | 131 | 995 | 22 | 3094 |
| 0815-0915 | 22 | 50 | 103 | 172 | 685 | 269 | 319 | 65 | 242 | 142 | 991 | 26 | 3086 |
| 0830-0930 | 27 | 51 | 97 | 200 | 674 | 266 | 295 | 72 | 231 | 161 | 977 | 30 | 3081 |
| 0845-0945 | 37 | 57 | 88 | 219 | 675 | 259 | 267 | 85 | 218 | 179 | 974 | 32 | 3090 |
| 0900-1000 | 46 | 55 | 78 | 239 | 713 | 224 | 255 | 93 | 199 | 189 | 946 | 36 | 3073 |

A.M. PEAK HOUR
0800-0900

WASHINGTON BOULEVARD




GLENCOE AVENUE

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

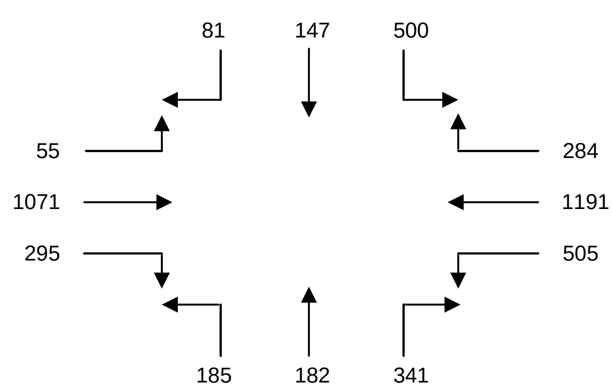
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: TUESDAY, DECEMBER 13, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S GLENCOE AVENUE
E/W WASHINGTON BOULEVARD
FILE NUMBER: 8-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 15 | 35 | 110 | 88 | 244 | 91 | 68 | 33 | 40 | 61 | 232 | 11 |
| 0415-0430 | 21 | 30 | 132 | 77 | 239 | 102 | 57 | 42 | 57 | 71 | 241 | 12 |
| 0430-0445 | 20 | 32 | 120 | 68 | 265 | 111 | 82 | 43 | 39 | 68 | 279 | 15 |
| 0445-0500 | 16 | 33 | 143 | 86 | 263 | 118 | 74 | 44 | 42 | 72 | 294 | 11 |
| 0500-0515 | 13 | 45 | 137 | 88 | 279 | 108 | 69 | 49 | 47 | 72 | 274 | 16 |
| 0515-0530 | 20 | 48 | 119 | 80 | 305 | 127 | 80 | 42 | 37 | 63 | 280 | 19 |
| 0530-0545 | 25 | 42 | 130 | 74 | 300 | 121 | 86 | 38 | 42 | 64 | 257 | 15 |
| 0545-0600 | 16 | 34 | 122 | 62 | 281 | 101 | 79 | 43 | 41 | 70 | 267 | 11 |
| 0600-0615 | 19 | 40 | 127 | 74 | 277 | 129 | 88 | 50 | 49 | 81 | 292 | 10 |
| 0615-0630 | 21 | 31 | 121 | 74 | 333 | 154 | 88 | 51 | 53 | 80 | 255 | 19 |
| 0630-0645 | 19 | 34 | 132 | 63 | 276 | 119 | 83 | 53 | 53 | 80 | 254 | 11 |
| 0645-0700 | 13 | 36 | 108 | 55 | 255 | 130 | 91 | 49 | 52 | 71 | 221 | 12 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 72 | 130 | 505 | 319 | 1011 | 422 | 281 | 162 | 178 | 272 | 1046 | 49 | 4447 |
| 0415-0515 | 70 | 140 | 532 | 319 | 1046 | 439 | 282 | 178 | 185 | 283 | 1088 | 54 | 4616 |
| 0430-0530 | 69 | 158 | 519 | 322 | 1112 | 464 | 305 | 178 | 165 | 275 | 1127 | 61 | 4755 |
| 0445-0545 | 74 | 168 | 529 | 328 | 1147 | 474 | 309 | 173 | 168 | 271 | 1105 | 61 | 4807 |
| 0500-0600 | 74 | 169 | 508 | 304 | 1165 | 457 | 314 | 172 | 167 | 269 | 1078 | 61 | 4738 |
| 0515-0615 | 80 | 164 | 498 | 290 | 1163 | 478 | 333 | 173 | 169 | 278 | 1096 | 55 | 4777 |
| 0530-0630 | 81 | 147 | 500 | 284 | 1191 | 505 | 341 | 182 | 185 | 295 | 1071 | 55 | 4837 |
| 0545-0645 | 75 | 139 | 502 | 273 | 1167 | 503 | 338 | 197 | 196 | 311 | 1068 | 51 | 4820 |
| 0600-0700 | 72 | 141 | 488 | 266 | 1141 | 532 | 350 | 203 | 207 | 312 | 1022 | 52 | 4786 |

P.M. PEAK HOUR
0530-0630

WASHINGTON BOULEVARD




GLENCOE AVENUE

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

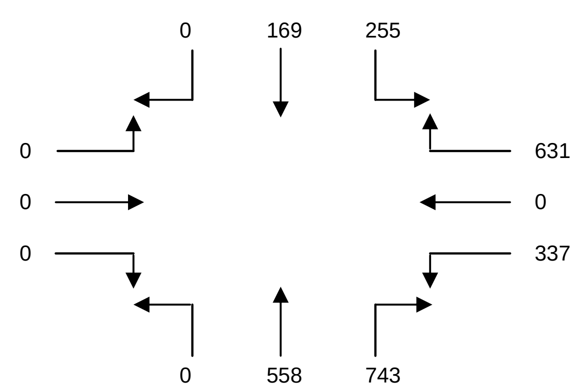
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | TUESDAY, DECEMBER 13, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | VIA MARINA |
| | E/W | ADMIRALTY WAY |
| FILE NUMBER: | | 9-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 0 | 28 | 33 | 77 | 0 | 23 | 106 | 82 | 0 | 0 | 0 | 0 |
| 0715-0730 | 0 | 30 | 29 | 124 | 0 | 48 | 132 | 100 | 0 | 0 | 0 | 0 |
| 0730-0745 | 0 | 40 | 45 | 157 | 0 | 55 | 159 | 132 | 0 | 0 | 0 | 0 |
| 0745-0800 | 0 | 31 | 43 | 172 | 0 | 81 | 160 | 115 | 0 | 0 | 0 | 0 |
| 0800-0815 | 0 | 42 | 58 | 169 | 0 | 91 | 176 | 137 | 0 | 0 | 0 | 0 |
| 0815-0830 | 0 | 47 | 73 | 153 | 0 | 71 | 195 | 139 | 0 | 0 | 0 | 0 |
| 0830-0845 | 0 | 43 | 67 | 162 | 0 | 78 | 185 | 139 | 0 | 0 | 0 | 0 |
| 0845-0900 | 0 | 37 | 57 | 147 | 0 | 97 | 187 | 143 | 0 | 0 | 0 | 0 |
| 0900-0915 | 0 | 42 | 69 | 133 | 0 | 87 | 151 | 119 | 0 | 0 | 0 | 0 |
| 0915-0930 | 0 | 46 | 68 | 131 | 0 | 58 | 162 | 132 | 0 | 0 | 0 | 0 |
| 0930-0945 | 0 | 33 | 53 | 141 | 0 | 86 | 133 | 123 | 0 | 0 | 0 | 0 |
| 0945-1000 | 0 | 35 | 50 | 127 | 0 | 71 | 164 | 120 | 0 | 0 | 0 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 0 | 129 | 150 | 530 | 0 | 207 | 557 | 429 | 0 | 0 | 0 | 0 | 2002 |
| 0715-0815 | 0 | 143 | 175 | 622 | 0 | 275 | 627 | 484 | 0 | 0 | 0 | 0 | 2326 |
| 0730-0830 | 0 | 160 | 219 | 651 | 0 | 298 | 690 | 523 | 0 | 0 | 0 | 0 | 2541 |
| 0745-0845 | 0 | 163 | 241 | 656 | 0 | 321 | 716 | 530 | 0 | 0 | 0 | 0 | 2627 |
| 0800-0900 | 0 | 169 | 255 | 631 | 0 | 337 | 743 | 558 | 0 | 0 | 0 | 0 | 2693 |
| 0815-0915 | 0 | 169 | 266 | 595 | 0 | 333 | 718 | 540 | 0 | 0 | 0 | 0 | 2621 |
| 0830-0930 | 0 | 168 | 261 | 573 | 0 | 320 | 685 | 533 | 0 | 0 | 0 | 0 | 2540 |
| 0845-0945 | 0 | 158 | 247 | 552 | 0 | 328 | 633 | 517 | 0 | 0 | 0 | 0 | 2435 |
| 0900-1000 | 0 | 156 | 240 | 532 | 0 | 302 | 610 | 494 | 0 | 0 | 0 | 0 | 2334 |

A.M. PEAK HOUR
0800-0900

ADMIRALTY WAY




VIA MARINA

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

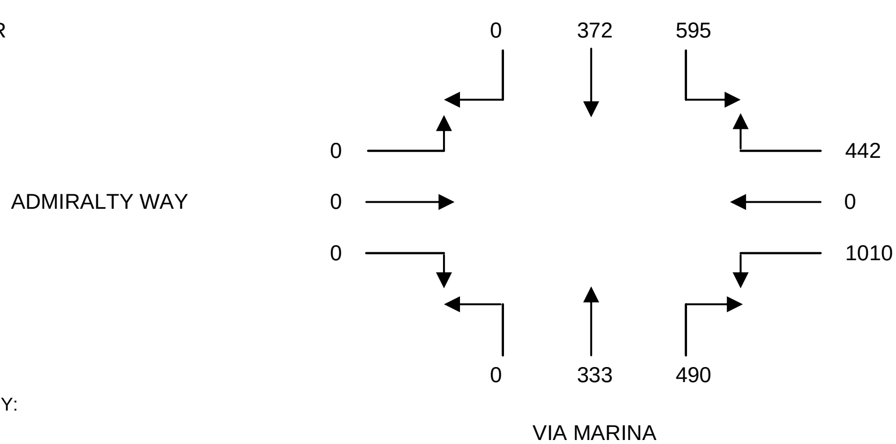
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: TUESDAY, DECEMBER 13, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S VIA MARINA
E/W ADMIRALTY WAY
FILE NUMBER: 9-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 0 | 60 | 105 | 90 | 0 | 115 | 108 | 77 | 0 | 0 | 0 | 0 |
| 0415-0430 | 0 | 85 | 129 | 119 | 0 | 198 | 119 | 80 | 0 | 0 | 0 | 0 |
| 0430-0445 | 0 | 93 | 117 | 106 | 0 | 190 | 114 | 79 | 0 | 0 | 0 | 0 |
| 0445-0500 | 0 | 91 | 111 | 84 | 0 | 182 | 132 | 67 | 0 | 0 | 0 | 0 |
| 0500-0515 | 0 | 75 | 140 | 105 | 0 | 190 | 131 | 77 | 0 | 0 | 0 | 0 |
| 0515-0530 | 0 | 64 | 159 | 121 | 0 | 213 | 132 | 92 | 0 | 0 | 0 | 0 |
| 0530-0545 | 0 | 83 | 136 | 105 | 0 | 210 | 118 | 84 | 0 | 0 | 0 | 0 |
| 0545-0600 | 0 | 100 | 161 | 123 | 0 | 230 | 121 | 70 | 0 | 0 | 0 | 0 |
| 0600-0615 | 0 | 95 | 150 | 103 | 0 | 293 | 150 | 89 | 0 | 0 | 0 | 0 |
| 0615-0630 | 0 | 84 | 143 | 116 | 0 | 258 | 119 | 86 | 0 | 0 | 0 | 0 |
| 0630-0645 | 0 | 93 | 141 | 100 | 0 | 229 | 100 | 88 | 0 | 0 | 0 | 0 |
| 0645-0700 | 0 | 101 | 122 | 117 | 0 | 200 | 99 | 82 | 0 | 0 | 0 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 0 | 329 | 462 | 399 | 0 | 685 | 473 | 303 | 0 | 0 | 0 | 0 | 2651 |
| 0415-0515 | 0 | 344 | 497 | 414 | 0 | 760 | 496 | 303 | 0 | 0 | 0 | 0 | 2814 |
| 0430-0530 | 0 | 323 | 527 | 416 | 0 | 775 | 509 | 315 | 0 | 0 | 0 | 0 | 2865 |
| 0445-0545 | 0 | 313 | 546 | 415 | 0 | 795 | 513 | 320 | 0 | 0 | 0 | 0 | 2902 |
| 0500-0600 | 0 | 322 | 596 | 454 | 0 | 843 | 502 | 323 | 0 | 0 | 0 | 0 | 3040 |
| 0515-0615 | 0 | 342 | 606 | 452 | 0 | 946 | 521 | 335 | 0 | 0 | 0 | 0 | 3202 |
| 0530-0630 | 0 | 362 | 590 | 447 | 0 | 991 | 508 | 329 | 0 | 0 | 0 | 0 | 3227 |
| 0545-0645 | 0 | 372 | 595 | 442 | 0 | 1010 | 490 | 333 | 0 | 0 | 0 | 0 | 3242 |
| 0600-0700 | 0 | 373 | 556 | 436 | 0 | 980 | 468 | 345 | 0 | 0 | 0 | 0 | 3158 |

P.M. PEAK HOUR
0545-0645




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

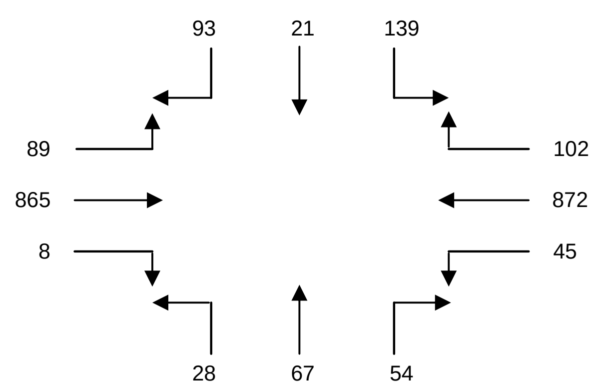
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | WEDNESDAY, DECEMBER 14, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | PALAWAN WAY |
| | E/W | ADMIRALTY WAY |
| FILE NUMBER: | | 10-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 7 | 1 | 12 | 10 | 122 | 4 | 6 | 4 | 0 | 2 | 146 | 9 |
| 0715-0730 | 10 | 2 | 15 | 12 | 153 | 5 | 16 | 9 | 3 | 3 | 153 | 13 |
| 0730-0745 | 15 | 2 | 18 | 19 | 195 | 7 | 13 | 12 | 2 | 1 | 176 | 10 |
| 0745-0800 | 20 | 3 | 27 | 29 | 238 | 15 | 12 | 11 | 3 | 2 | 177 | 19 |
| 0800-0815 | 28 | 3 | 36 | 33 | 249 | 11 | 19 | 16 | 5 | 1 | 220 | 23 |
| 0815-0830 | 24 | 6 | 33 | 22 | 200 | 10 | 12 | 19 | 9 | 3 | 212 | 24 |
| 0830-0845 | 21 | 5 | 37 | 23 | 215 | 11 | 13 | 14 | 5 | 1 | 204 | 20 |
| 0845-0900 | 20 | 7 | 33 | 24 | 208 | 13 | 10 | 18 | 9 | 3 | 229 | 22 |
| 0900-0915 | 20 | 8 | 31 | 24 | 197 | 9 | 13 | 15 | 5 | 4 | 223 | 25 |
| 0915-0930 | 20 | 9 | 32 | 27 | 181 | 9 | 17 | 16 | 5 | 4 | 213 | 24 |
| 0930-0945 | 22 | 8 | 33 | 23 | 167 | 8 | 11 | 13 | 9 | 6 | 173 | 20 |
| 0945-1000 | 20 | 10 | 32 | 22 | 158 | 11 | 5 | 13 | 6 | 4 | 162 | 16 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 52 | 8 | 72 | 70 | 708 | 31 | 47 | 36 | 8 | 8 | 652 | 51 | 1743 |
| 0715-0815 | 73 | 10 | 96 | 93 | 835 | 38 | 60 | 48 | 13 | 7 | 726 | 65 | 2064 |
| 0730-0830 | 87 | 14 | 114 | 103 | 882 | 43 | 56 | 58 | 19 | 7 | 785 | 76 | 2244 |
| 0745-0845 | 93 | 17 | 133 | 107 | 902 | 47 | 56 | 60 | 22 | 7 | 813 | 86 | 2343 |
| 0800-0900 | 93 | 21 | 139 | 102 | 872 | 45 | 54 | 67 | 28 | 8 | 865 | 89 | 2383 |
| 0815-0915 | 85 | 26 | 134 | 93 | 820 | 43 | 48 | 66 | 28 | 11 | 868 | 91 | 2313 |
| 0830-0930 | 81 | 29 | 133 | 98 | 801 | 42 | 53 | 63 | 24 | 12 | 869 | 91 | 2296 |
| 0845-0945 | 82 | 32 | 129 | 98 | 753 | 39 | 51 | 62 | 28 | 17 | 838 | 91 | 2220 |
| 0900-1000 | 82 | 35 | 128 | 96 | 703 | 37 | 46 | 57 | 25 | 18 | 771 | 85 | 2083 |

A.M. PEAK HOUR
0800-0900

ADMIRALTY WAY




PALAWAN WAY


DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

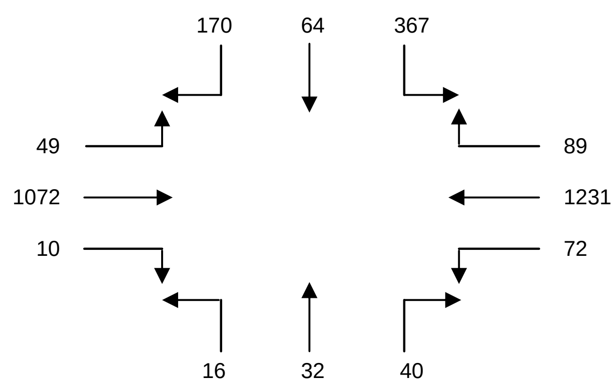
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | WEDNESDAY, DECEMBER 14, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | PALAWAN WAY |
| | E/W | ADMIRALTY WAY |
| FILE NUMBER: | | 10-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 33 | 13 | 63 | 18 | 171 | 16 | 7 | 4 | 6 | 1 | 174 | 8 |
| 0415-0430 | 39 | 12 | 73 | 21 | 203 | 19 | 12 | 7 | 8 | 1 | 213 | 10 |
| 0430-0445 | 30 | 7 | 54 | 24 | 229 | 16 | 10 | 8 | 6 | 2 | 233 | 11 |
| 0445-0500 | 36 | 11 | 67 | 23 | 256 | 13 | 10 | 5 | 4 | 6 | 227 | 12 |
| 0500-0515 | 49 | 10 | 63 | 22 | 252 | 16 | 14 | 9 | 7 | 4 | 211 | 7 |
| 0515-0530 | 37 | 15 | 76 | 20 | 264 | 17 | 11 | 9 | 4 | 3 | 249 | 8 |
| 0530-0545 | 36 | 17 | 70 | 27 | 307 | 20 | 10 | 5 | 2 | 3 | 273 | 11 |
| 0545-0600 | 45 | 13 | 81 | 20 | 314 | 17 | 13 | 10 | 6 | 2 | 322 | 11 |
| 0600-0615 | 46 | 15 | 111 | 25 | 303 | 18 | 7 | 6 | 4 | 3 | 245 | 10 |
| 0615-0630 | 43 | 19 | 105 | 17 | 307 | 17 | 10 | 11 | 4 | 2 | 232 | 17 |
| 0630-0645 | 42 | 16 | 70 | 16 | 295 | 21 | 14 | 5 | 6 | 3 | 216 | 11 |
| 0645-0700 | 33 | 18 | 66 | 14 | 288 | 18 | 14 | 3 | 9 | 3 | 242 | 8 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 138 | 43 | 257 | 86 | 859 | 64 | 39 | 24 | 24 | 10 | 847 | 41 | 2432 |
| 0415-0515 | 154 | 40 | 257 | 90 | 940 | 64 | 46 | 29 | 25 | 13 | 884 | 40 | 2582 |
| 0430-0530 | 152 | 43 | 260 | 89 | 1001 | 62 | 45 | 31 | 21 | 15 | 920 | 38 | 2677 |
| 0445-0545 | 158 | 53 | 276 | 92 | 1079 | 66 | 45 | 28 | 17 | 16 | 960 | 38 | 2828 |
| 0500-0600 | 167 | 55 | 290 | 89 | 1137 | 70 | 48 | 33 | 19 | 12 | 1055 | 37 | 3012 |
| 0515-0615 | 164 | 60 | 338 | 92 | 1188 | 72 | 41 | 30 | 16 | 11 | 1089 | 40 | 3141 |
| 0530-0630 | 170 | 64 | 367 | 89 | 1231 | 72 | 40 | 32 | 16 | 10 | 1072 | 49 | 3212 |
| 0545-0645 | 176 | 63 | 367 | 78 | 1219 | 73 | 44 | 32 | 20 | 10 | 1015 | 49 | 3146 |
| 0600-0700 | 164 | 68 | 352 | 72 | 1193 | 74 | 45 | 25 | 23 | 11 | 935 | 46 | 3008 |

P.M. PEAK HOUR
0530-0630

ADMIRALTY WAY




PALAWAN WAY

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

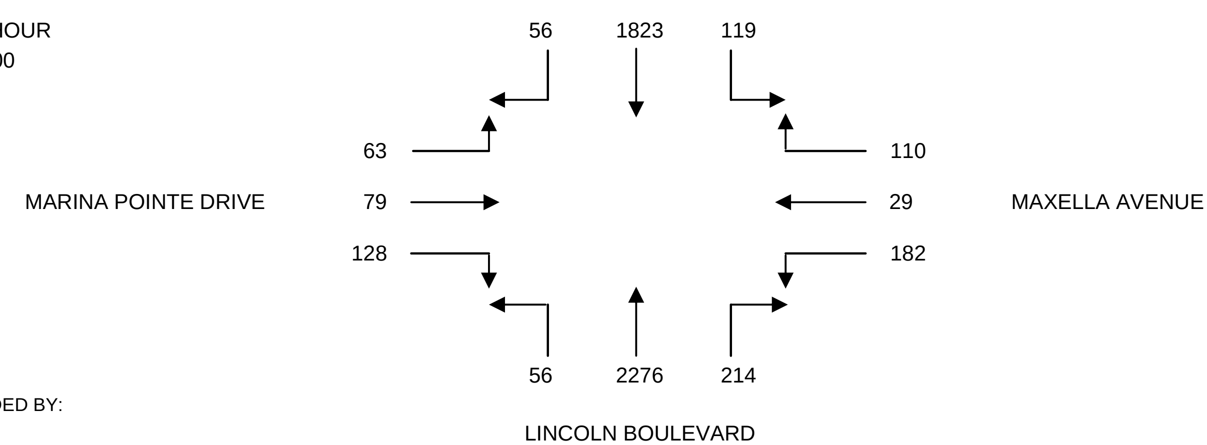
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: WEDNESDAY, DECEMBER 14, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S LINCOLN BOULEVARD
E/W MARINA POINTE DRIVE / MAXELLA AVENUE
FILE NUMBER: 11-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 3 | 222 | 11 | 19 | 8 | 22 | 25 | 450 | 8 | 23 | 12 | 10 |
| 0715-0730 | 6 | 239 | 15 | 23 | 10 | 20 | 45 | 557 | 15 | 29 | 12 | 13 |
| 0730-0745 | 10 | 348 | 16 | 33 | 7 | 25 | 53 | 581 | 10 | 33 | 14 | 15 |
| 0745-0800 | 9 | 361 | 28 | 30 | 10 | 31 | 47 | 573 | 13 | 38 | 22 | 13 |
| 0800-0815 | 9 | 447 | 40 | 25 | 5 | 42 | 48 | 611 | 12 | 37 | 20 | 14 |
| 0815-0830 | 19 | 423 | 35 | 29 | 7 | 48 | 52 | 592 | 15 | 30 | 18 | 13 |
| 0830-0845 | 14 | 483 | 23 | 32 | 9 | 39 | 58 | 521 | 16 | 31 | 19 | 17 |
| 0845-0900 | 14 | 470 | 21 | 24 | 8 | 53 | 56 | 552 | 13 | 30 | 22 | 19 |
| 0900-0915 | 17 | 451 | 28 | 26 | 10 | 50 | 68 | 543 | 18 | 28 | 22 | 18 |
| 0915-0930 | 19 | 449 | 37 | 36 | 8 | 52 | 55 | 513 | 15 | 24 | 21 | 20 |
| 0930-0945 | 22 | 379 | 49 | 33 | 12 | 38 | 52 | 495 | 16 | 24 | 18 | 19 |
| 0945-1000 | 16 | 371 | 43 | 25 | 9 | 35 | 51 | 462 | 14 | 25 | 14 | 17 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 28 | 1170 | 70 | 105 | 35 | 98 | 170 | 2161 | 46 | 123 | 60 | 51 | 4117 |
| 0715-0815 | 34 | 1395 | 99 | 111 | 32 | 118 | 193 | 2322 | 50 | 137 | 68 | 55 | 4614 |
| 0730-0830 | 47 | 1579 | 119 | 117 | 29 | 146 | 200 | 2357 | 50 | 138 | 74 | 55 | 4911 |
| 0745-0845 | 51 | 1714 | 126 | 116 | 31 | 160 | 205 | 2297 | 56 | 136 | 79 | 57 | 5028 |
| 0800-0900 | 56 | 1823 | 119 | 110 | 29 | 182 | 214 | 2276 | 56 | 128 | 79 | 63 | 5135 |
| 0815-0915 | 64 | 1827 | 107 | 111 | 34 | 190 | 234 | 2208 | 62 | 119 | 81 | 67 | 5104 |
| 0830-0930 | 64 | 1853 | 109 | 118 | 35 | 194 | 237 | 2129 | 62 | 113 | 84 | 74 | 5072 |
| 0845-0945 | 72 | 1749 | 135 | 119 | 38 | 193 | 231 | 2103 | 62 | 106 | 83 | 76 | 4967 |
| 0900-1000 | 74 | 1650 | 157 | 120 | 39 | 175 | 226 | 2013 | 63 | 101 | 75 | 74 | 4767 |

A.M. PEAK HOUR
0800-0900





DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

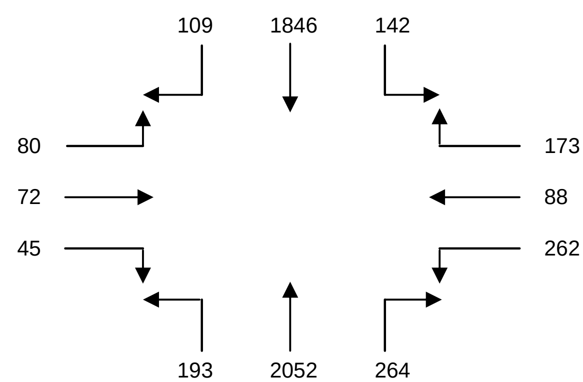
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: WEDNESDAY, DECEMBER 14, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S LINCOLN BOULEVARD
E/W MARINA POINTE DRIVE / MAXELLA AVENUE
FILE NUMBER: 11-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 20 | 448 | 44 | 56 | 12 | 61 | 55 | 437 | 35 | 15 | 12 | 16 |
| 0415-0430 | 24 | 468 | 53 | 37 | 17 | 64 | 75 | 473 | 37 | 19 | 18 | 18 |
| 0430-0445 | 29 | 450 | 46 | 48 | 14 | 79 | 55 | 439 | 47 | 18 | 17 | 18 |
| 0445-0500 | 21 | 487 | 37 | 44 | 16 | 64 | 70 | 464 | 47 | 14 | 12 | 19 |
| 0500-0515 | 22 | 467 | 40 | 38 | 18 | 79 | 72 | 482 | 51 | 10 | 17 | 17 |
| 0515-0530 | 27 | 468 | 37 | 43 | 22 | 60 | 72 | 537 | 40 | 14 | 20 | 19 |
| 0530-0545 | 29 | 467 | 31 | 47 | 21 | 59 | 66 | 533 | 45 | 11 | 22 | 24 |
| 0545-0600 | 31 | 444 | 34 | 45 | 27 | 64 | 54 | 500 | 57 | 10 | 13 | 20 |
| 0600-0615 | 35 | 452 | 38 | 48 | 24 | 65 | 62 | 462 | 50 | 7 | 19 | 23 |
| 0615-0630 | 29 | 464 | 41 | 49 | 22 | 67 | 50 | 482 | 32 | 10 | 15 | 21 |
| 0630-0645 | 22 | 479 | 33 | 42 | 27 | 59 | 57 | 471 | 46 | 9 | 17 | 22 |
| 0645-0700 | 25 | 466 | 29 | 44 | 22 | 63 | 46 | 439 | 45 | 8 | 16 | 17 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 94 | 1853 | 180 | 185 | 59 | 268 | 255 | 1813 | 166 | 66 | 59 | 71 | 5069 |
| 0415-0515 | 96 | 1872 | 176 | 167 | 65 | 286 | 272 | 1858 | 182 | 61 | 64 | 72 | 5171 |
| 0430-0530 | 99 | 1872 | 160 | 173 | 70 | 282 | 269 | 1922 | 185 | 56 | 66 | 73 | 5227 |
| 0445-0545 | 99 | 1889 | 145 | 172 | 77 | 262 | 280 | 2016 | 183 | 49 | 71 | 79 | 5322 |
| 0500-0600 | 109 | 1846 | 142 | 173 | 88 | 262 | 264 | 2052 | 193 | 45 | 72 | 80 | 5326 |
| 0515-0615 | 122 | 1831 | 140 | 183 | 94 | 248 | 254 | 2032 | 192 | 42 | 74 | 86 | 5298 |
| 0530-0630 | 124 | 1827 | 144 | 189 | 94 | 255 | 232 | 1977 | 184 | 38 | 69 | 88 | 5221 |
| 0545-0645 | 117 | 1839 | 146 | 184 | 100 | 255 | 223 | 1915 | 185 | 36 | 64 | 86 | 5150 |
| 0600-0700 | 111 | 1861 | 141 | 183 | 95 | 254 | 215 | 1854 | 173 | 34 | 67 | 83 | 5071 |

P.M. PEAK HOUR
0500-0600

MARINA POINTE DRIVE




MAXELLA AVENUE

LINCOLN BOULEVARD

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

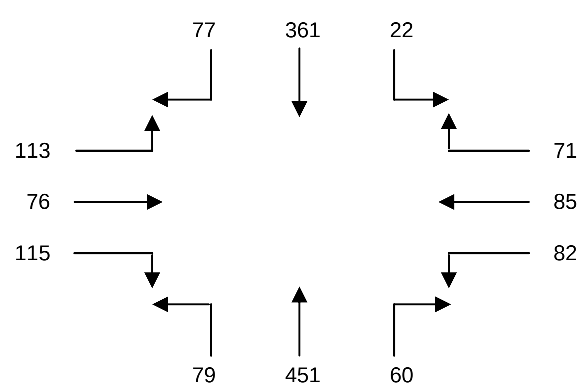
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S GLENCOE AVENUE
E/W MAXELLA AVENUE
FILE NUMBER: 12-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 9 | 28 | 0 | 9 | 15 | 3 | 11 | 52 | 11 | 9 | 18 | 13 |
| 0715-0730 | 11 | 46 | 2 | 8 | 16 | 9 | 9 | 107 | 17 | 15 | 22 | 24 |
| 0730-0745 | 13 | 54 | 3 | 13 | 17 | 12 | 12 | 122 | 14 | 23 | 15 | 26 |
| 0745-0800 | 17 | 75 | 6 | 21 | 20 | 20 | 25 | 133 | 14 | 28 | 14 | 30 |
| 0800-0815 | 19 | 88 | 4 | 20 | 16 | 29 | 20 | 129 | 19 | 31 | 15 | 24 |
| 0815-0830 | 18 | 82 | 7 | 17 | 22 | 20 | 11 | 117 | 16 | 31 | 26 | 32 |
| 0830-0845 | 20 | 84 | 4 | 15 | 24 | 20 | 12 | 103 | 19 | 28 | 20 | 24 |
| 0845-0900 | 20 | 107 | 7 | 19 | 23 | 13 | 17 | 102 | 25 | 25 | 15 | 33 |
| 0900-0915 | 20 | 93 | 3 | 13 | 21 | 14 | 17 | 104 | 29 | 34 | 19 | 28 |
| 0915-0930 | 19 | 80 | 4 | 7 | 20 | 15 | 15 | 105 | 22 | 35 | 19 | 23 |
| 0930-0945 | 21 | 88 | 6 | 11 | 22 | 15 | 15 | 106 | 24 | 33 | 15 | 22 |
| 0945-1000 | 19 | 90 | 3 | 11 | 17 | 11 | 14 | 103 | 19 | 30 | 20 | 24 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 50 | 203 | 11 | 51 | 68 | 44 | 57 | 414 | 56 | 75 | 69 | 93 | 1191 |
| 0715-0815 | 60 | 263 | 15 | 62 | 69 | 70 | 66 | 491 | 64 | 97 | 66 | 104 | 1427 |
| 0730-0830 | 67 | 299 | 20 | 71 | 75 | 81 | 68 | 501 | 63 | 113 | 70 | 112 | 1540 |
| 0745-0845 | 74 | 329 | 21 | 73 | 82 | 89 | 68 | 482 | 68 | 118 | 75 | 110 | 1589 |
| 0800-0900 | 77 | 361 | 22 | 71 | 85 | 82 | 60 | 451 | 79 | 115 | 76 | 113 | 1592 |
| 0815-0915 | 78 | 366 | 21 | 64 | 90 | 67 | 57 | 426 | 89 | 118 | 80 | 117 | 1573 |
| 0830-0930 | 79 | 364 | 18 | 54 | 88 | 62 | 61 | 414 | 95 | 122 | 73 | 108 | 1538 |
| 0845-0945 | 80 | 368 | 20 | 50 | 86 | 57 | 64 | 417 | 100 | 127 | 68 | 106 | 1543 |
| 0900-1000 | 79 | 351 | 16 | 42 | 80 | 55 | 61 | 418 | 94 | 132 | 73 | 97 | 1498 |

A.M. PEAK HOUR
0800-0900

MAXELLA AVENUE




GLENCOE AVENUE


DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877

.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

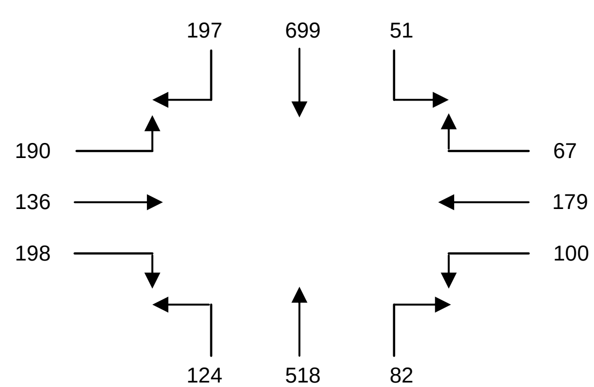
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 15, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | GLENCOE AVENUE |
| | E/W | MAXELLA AVENUE |
| FILE NUMBER: | | 12-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 30 | 125 | 14 | 22 | 23 | 24 | 17 | 117 | 30 | 63 | 19 | 31 |
| 0415-0430 | 30 | 128 | 13 | 20 | 28 | 18 | 24 | 118 | 44 | 56 | 17 | 24 |
| 0430-0445 | 38 | 144 | 19 | 21 | 35 | 14 | 20 | 119 | 34 | 50 | 24 | 39 |
| 0445-0500 | 44 | 170 | 13 | 19 | 34 | 12 | 20 | 121 | 31 | 51 | 24 | 48 |
| 0500-0515 | 40 | 152 | 17 | 15 | 47 | 18 | 16 | 123 | 22 | 60 | 29 | 40 |
| 0515-0530 | 33 | 155 | 12 | 17 | 32 | 20 | 21 | 111 | 30 | 47 | 33 | 41 |
| 0530-0545 | 34 | 168 | 15 | 19 | 34 | 24 | 24 | 122 | 31 | 62 | 36 | 51 |
| 0545-0600 | 40 | 172 | 11 | 16 | 41 | 28 | 21 | 131 | 27 | 52 | 31 | 40 |
| 0600-0615 | 50 | 182 | 11 | 19 | 46 | 25 | 20 | 133 | 27 | 47 | 31 | 55 |
| 0615-0630 | 57 | 166 | 14 | 15 | 45 | 27 | 21 | 122 | 31 | 49 | 37 | 50 |
| 0630-0645 | 43 | 171 | 15 | 17 | 41 | 26 | 22 | 134 | 36 | 45 | 35 | 46 |
| 0645-0700 | 47 | 180 | 11 | 16 | 47 | 22 | 19 | 129 | 30 | 57 | 33 | 39 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 142 | 567 | 59 | 82 | 120 | 68 | 81 | 475 | 139 | 220 | 84 | 142 | 2179 |
| 0415-0515 | 152 | 594 | 62 | 75 | 144 | 62 | 80 | 481 | 131 | 217 | 94 | 151 | 2243 |
| 0430-0530 | 155 | 621 | 61 | 72 | 148 | 64 | 77 | 474 | 117 | 208 | 110 | 168 | 2275 |
| 0445-0545 | 151 | 645 | 57 | 70 | 147 | 74 | 81 | 477 | 114 | 220 | 122 | 180 | 2338 |
| 0500-0600 | 147 | 647 | 55 | 67 | 154 | 90 | 82 | 487 | 110 | 221 | 129 | 172 | 2361 |
| 0515-0615 | 157 | 677 | 49 | 71 | 153 | 97 | 86 | 497 | 115 | 208 | 131 | 187 | 2428 |
| 0530-0630 | 181 | 688 | 51 | 69 | 166 | 104 | 86 | 508 | 116 | 210 | 135 | 196 | 2510 |
| 0545-0645 | 190 | 691 | 51 | 67 | 173 | 106 | 84 | 520 | 121 | 193 | 134 | 191 | 2521 |
| 0600-0700 | 197 | 699 | 51 | 67 | 179 | 100 | 82 | 518 | 124 | 198 | 136 | 190 | 2541 |

P.M. PEAK HOUR
0600-0700

MAXELLA AVENUE




GLENCOE AVENUE


DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877

.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

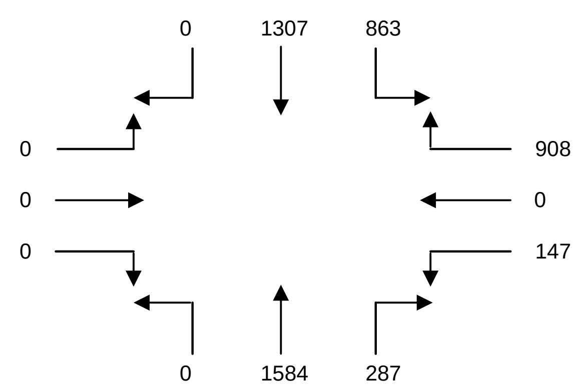
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 15, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | LINCOLN BOULEVARD |
| | E/W | MARINA EXPRESSWAY |
| FILE NUMBER: | | 13-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 0 | 153 | 119 | 176 | 0 | 13 | 35 | 307 | 0 | 0 | 0 | 0 |
| 0715-0730 | 0 | 163 | 131 | 220 | 0 | 24 | 30 | 314 | 0 | 0 | 0 | 0 |
| 0730-0745 | 0 | 203 | 158 | 208 | 0 | 24 | 47 | 444 | 0 | 0 | 0 | 0 |
| 0745-0800 | 0 | 247 | 183 | 256 | 0 | 30 | 55 | 431 | 0 | 0 | 0 | 0 |
| 0800-0815 | 0 | 284 | 220 | 232 | 0 | 31 | 64 | 401 | 0 | 0 | 0 | 0 |
| 0815-0830 | 0 | 311 | 227 | 216 | 0 | 38 | 61 | 422 | 0 | 0 | 0 | 0 |
| 0830-0845 | 0 | 329 | 230 | 208 | 0 | 32 | 71 | 379 | 0 | 0 | 0 | 0 |
| 0845-0900 | 0 | 326 | 218 | 248 | 0 | 36 | 89 | 406 | 0 | 0 | 0 | 0 |
| 0900-0915 | 0 | 320 | 201 | 233 | 0 | 39 | 61 | 378 | 0 | 0 | 0 | 0 |
| 0915-0930 | 0 | 332 | 214 | 219 | 0 | 40 | 66 | 421 | 0 | 0 | 0 | 0 |
| 0930-0945 | 0 | 318 | 170 | 208 | 0 | 32 | 76 | 362 | 0 | 0 | 0 | 0 |
| 0945-1000 | 0 | 304 | 193 | 197 | 0 | 33 | 65 | 343 | 0 | 0 | 0 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 0 | 766 | 591 | 860 | 0 | 91 | 167 | 1496 | 0 | 0 | 0 | 0 | 3971 |
| 0715-0815 | 0 | 897 | 692 | 916 | 0 | 109 | 196 | 1590 | 0 | 0 | 0 | 0 | 4400 |
| 0730-0830 | 0 | 1045 | 788 | 912 | 0 | 123 | 227 | 1698 | 0 | 0 | 0 | 0 | 4793 |
| 0745-0845 | 0 | 1171 | 860 | 912 | 0 | 131 | 251 | 1633 | 0 | 0 | 0 | 0 | 4958 |
| 0800-0900 | 0 | 1250 | 895 | 904 | 0 | 137 | 285 | 1608 | 0 | 0 | 0 | 0 | 5079 |
| 0815-0915 | 0 | 1286 | 876 | 905 | 0 | 145 | 282 | 1585 | 0 | 0 | 0 | 0 | 5079 |
| 0830-0930 | 0 | 1307 | 863 | 908 | 0 | 147 | 287 | 1584 | 0 | 0 | 0 | 0 | 5096 |
| 0845-0945 | 0 | 1296 | 803 | 908 | 0 | 147 | 292 | 1567 | 0 | 0 | 0 | 0 | 5013 |
| 0900-1000 | 0 | 1274 | 778 | 857 | 0 | 144 | 268 | 1504 | 0 | 0 | 0 | 0 | 4825 |

A.M. PEAK HOUR
0830-0930

MARINA EXPRESSWAY




LINCOLN BOULEVARD


DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877

.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

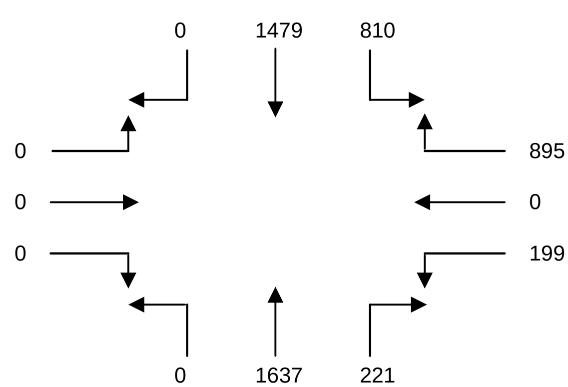
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S LINCOLN BOULEVARD
E/W MARINA EXPRESSWAY
FILE NUMBER: 13-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 0 | 347 | 217 | 176 | 0 | 28 | 68 | 360 | 0 | 0 | 0 | 0 |
| 0415-0430 | 0 | 352 | 205 | 190 | 0 | 38 | 66 | 382 | 0 | 0 | 0 | 0 |
| 0430-0445 | 0 | 382 | 213 | 201 | 0 | 32 | 49 | 356 | 0 | 0 | 0 | 0 |
| 0445-0500 | 0 | 343 | 189 | 218 | 0 | 43 | 54 | 407 | 0 | 0 | 0 | 0 |
| 0500-0515 | 0 | 397 | 188 | 224 | 0 | 40 | 58 | 416 | 0 | 0 | 0 | 0 |
| 0515-0530 | 0 | 398 | 202 | 213 | 0 | 48 | 61 | 417 | 0 | 0 | 0 | 0 |
| 0530-0545 | 0 | 355 | 219 | 230 | 0 | 50 | 54 | 404 | 0 | 0 | 0 | 0 |
| 0545-0600 | 0 | 329 | 201 | 228 | 0 | 61 | 48 | 400 | 0 | 0 | 0 | 0 |
| 0600-0615 | 0 | 350 | 200 | 187 | 0 | 54 | 62 | 425 | 0 | 0 | 0 | 0 |
| 0615-0630 | 0 | 346 | 196 | 183 | 0 | 52 | 63 | 392 | 0 | 0 | 0 | 0 |
| 0630-0645 | 0 | 372 | 197 | 188 | 0 | 36 | 30 | 367 | 0 | 0 | 0 | 0 |
| 0645-0700 | 0 | 360 | 188 | 229 | 0 | 44 | 37 | 356 | 0 | 0 | 0 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 0 | 1424 | 824 | 785 | 0 | 141 | 237 | 1505 | 0 | 0 | 0 | 0 | 4916 |
| 0415-0515 | 0 | 1474 | 795 | 833 | 0 | 153 | 227 | 1561 | 0 | 0 | 0 | 0 | 5043 |
| 0430-0530 | 0 | 1520 | 792 | 856 | 0 | 163 | 222 | 1596 | 0 | 0 | 0 | 0 | 5149 |
| 0445-0545 | 0 | 1493 | 798 | 885 | 0 | 181 | 227 | 1644 | 0 | 0 | 0 | 0 | 5228 |
| 0500-0600 | 0 | 1479 | 810 | 895 | 0 | 199 | 221 | 1637 | 0 | 0 | 0 | 0 | 5241 |
| 0515-0615 | 0 | 1432 | 822 | 858 | 0 | 213 | 225 | 1646 | 0 | 0 | 0 | 0 | 5196 |
| 0530-0630 | 0 | 1380 | 816 | 828 | 0 | 217 | 227 | 1621 | 0 | 0 | 0 | 0 | 5089 |
| 0545-0645 | 0 | 1397 | 794 | 786 | 0 | 203 | 203 | 1584 | 0 | 0 | 0 | 0 | 4967 |
| 0600-0700 | 0 | 1428 | 781 | 787 | 0 | 186 | 192 | 1540 | 0 | 0 | 0 | 0 | 4914 |

P.M. PEAK HOUR
0500-0600

MARINA EXPRESSWAY




LINCOLN BOULEVARD

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

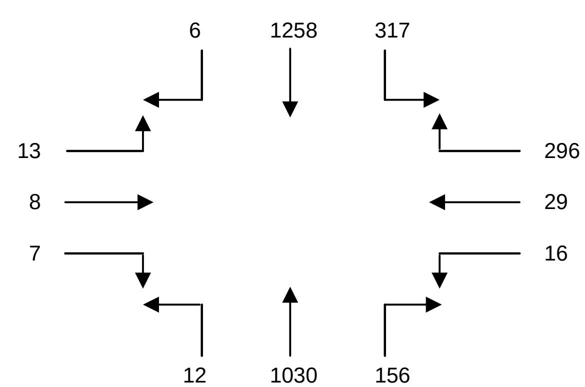
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 15, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | ADMIRALTY WAY |
| | E/W | BALI WAY |
| FILE NUMBER: | | 14-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 0 | 147 | 40 | 32 | 3 | 2 | 5 | 124 | 2 | 0 | 3 | 3 |
| 0715-0730 | 0 | 175 | 61 | 49 | 2 | 1 | 14 | 180 | 2 | 3 | 2 | 2 |
| 0730-0745 | 0 | 246 | 89 | 47 | 5 | 0 | 29 | 277 | 6 | 4 | 2 | 2 |
| 0745-0800 | 3 | 292 | 64 | 64 | 5 | 2 | 37 | 273 | 4 | 0 | 3 | 2 |
| 0800-0815 | 2 | 340 | 81 | 82 | 12 | 2 | 41 | 250 | 3 | 1 | 1 | 2 |
| 0815-0830 | 1 | 291 | 78 | 63 | 7 | 6 | 30 | 233 | 2 | 2 | 4 | 4 |
| 0830-0845 | 2 | 301 | 83 | 68 | 4 | 4 | 42 | 268 | 2 | 1 | 0 | 3 |
| 0845-0900 | 1 | 326 | 75 | 83 | 6 | 4 | 43 | 279 | 5 | 3 | 3 | 4 |
| 0900-0915 | 0 | 209 | 68 | 67 | 4 | 6 | 33 | 255 | 4 | 3 | 5 | 5 |
| 0915-0930 | 0 | 250 | 50 | 42 | 2 | 4 | 31 | 239 | 3 | 1 | 2 | 8 |
| 0930-0945 | 1 | 234 | 54 | 45 | 2 | 4 | 34 | 201 | 4 | 2 | 5 | 10 |
| 0945-1000 | 1 | 223 | 58 | 36 | 1 | 2 | 24 | 199 | 4 | 1 | 3 | 7 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 3 | 860 | 254 | 192 | 15 | 5 | 85 | 854 | 14 | 7 | 10 | 9 | 2308 |
| 0715-0815 | 5 | 1053 | 295 | 242 | 24 | 5 | 121 | 980 | 15 | 8 | 8 | 8 | 2764 |
| 0730-0830 | 6 | 1169 | 312 | 256 | 29 | 10 | 137 | 1033 | 15 | 7 | 10 | 10 | 2994 |
| 0745-0845 | 8 | 1224 | 306 | 277 | 28 | 14 | 150 | 1024 | 11 | 4 | 8 | 11 | 3065 |
| 0800-0900 | 6 | 1258 | 317 | 296 | 29 | 16 | 156 | 1030 | 12 | 7 | 8 | 13 | 3148 |
| 0815-0915 | 4 | 1127 | 304 | 281 | 21 | 20 | 148 | 1035 | 13 | 9 | 12 | 16 | 2990 |
| 0830-0930 | 3 | 1086 | 276 | 260 | 16 | 18 | 149 | 1041 | 14 | 8 | 10 | 20 | 2901 |
| 0845-0945 | 2 | 1019 | 247 | 237 | 14 | 18 | 141 | 974 | 16 | 9 | 15 | 27 | 2719 |
| 0900-1000 | 2 | 916 | 230 | 190 | 9 | 16 | 122 | 894 | 15 | 7 | 15 | 30 | 2446 |

A.M. PEAK HOUR
0800-0900

BALI WAY




ADMIRALTY WAY

DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

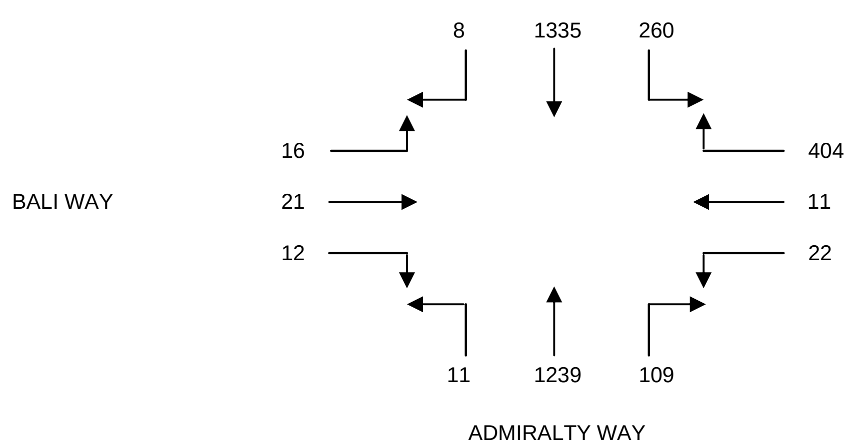
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S ADMIRALTY WAY
E/W BALI WAY
FILE NUMBER: 14-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 0 | 277 | 62 | 88 | 1 | 5 | 27 | 269 | 5 | 3 | 3 | 5 |
| 0415-0430 | 0 | 304 | 70 | 91 | 2 | 5 | 30 | 285 | 3 | 3 | 5 | 6 |
| 0430-0445 | 3 | 282 | 68 | 114 | 2 | 7 | 31 | 310 | 5 | 3 | 4 | 10 |
| 0445-0500 | 2 | 326 | 70 | 86 | 3 | 5 | 31 | 291 | 3 | 4 | 7 | 6 |
| 0500-0515 | 4 | 317 | 67 | 88 | 4 | 6 | 28 | 299 | 6 | 5 | 5 | 7 |
| 0515-0530 | 5 | 315 | 65 | 102 | 2 | 7 | 27 | 311 | 3 | 3 | 4 | 4 |
| 0530-0545 | 1 | 347 | 64 | 98 | 3 | 8 | 35 | 273 | 4 | 4 | 5 | 6 |
| 0545-0600 | 2 | 328 | 69 | 96 | 3 | 4 | 22 | 300 | 2 | 2 | 5 | 3 |
| 0600-0615 | 0 | 345 | 62 | 108 | 3 | 3 | 25 | 355 | 2 | 3 | 7 | 3 |
| 0615-0630 | 1 | 285 | 56 | 84 | 2 | 4 | 23 | 245 | 3 | 3 | 5 | 4 |
| 0630-0645 | 1 | 290 | 50 | 95 | 3 | 4 | 20 | 204 | 2 | 1 | 6 | 4 |
| 0645-0700 | 1 | 275 | 53 | 85 | 2 | 3 | 18 | 182 | 2 | 2 | 4 | 3 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 5 | 1189 | 270 | 379 | 8 | 22 | 119 | 1155 | 16 | 13 | 19 | 27 | 3222 |
| 0415-0515 | 9 | 1229 | 275 | 379 | 11 | 23 | 120 | 1185 | 17 | 15 | 21 | 29 | 3313 |
| 0430-0530 | 14 | 1240 | 270 | 390 | 11 | 25 | 117 | 1211 | 17 | 15 | 20 | 27 | 3357 |
| 0445-0545 | 12 | 1305 | 266 | 374 | 12 | 26 | 121 | 1174 | 16 | 16 | 21 | 23 | 3366 |
| 0500-0600 | 12 | 1307 | 265 | 384 | 12 | 25 | 112 | 1183 | 15 | 14 | 19 | 20 | 3368 |
| 0515-0615 | 8 | 1335 | 260 | 404 | 11 | 22 | 109 | 1239 | 11 | 12 | 21 | 16 | 3448 |
| 0530-0630 | 4 | 1305 | 251 | 386 | 11 | 19 | 105 | 1173 | 11 | 12 | 22 | 16 | 3315 |
| 0545-0645 | 4 | 1248 | 237 | 383 | 11 | 15 | 90 | 1104 | 9 | 9 | 23 | 14 | 3147 |
| 0600-0700 | 3 | 1195 | 221 | 372 | 10 | 14 | 86 | 986 | 9 | 9 | 22 | 14 | 2941 |

P.M. PEAK HOUR
0515-0615




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

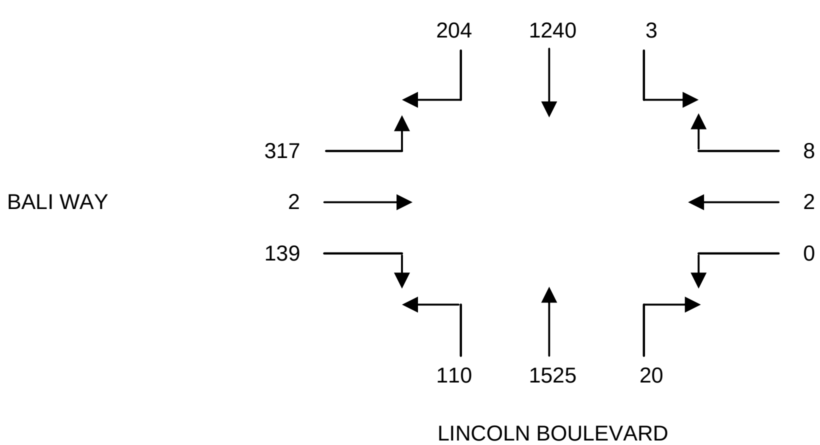
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S LINCOLN BOULEVARD
E/W BALI WAY
FILE NUMBER: 15-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 18 | 112 | 0 | 0 | 0 | 0 | 7 | 283 | 18 | 22 | 0 | 38 |
| 0715-0730 | 27 | 179 | 2 | 1 | 0 | 1 | 11 | 326 | 24 | 26 | 1 | 58 |
| 0730-0745 | 39 | 217 | 0 | 1 | 0 | 0 | 6 | 351 | 27 | 27 | 0 | 72 |
| 0745-0800 | 48 | 230 | 1 | 0 | 1 | 0 | 6 | 407 | 23 | 30 | 0 | 83 |
| 0800-0815 | 57 | 246 | 1 | 1 | 0 | 1 | 6 | 372 | 33 | 32 | 0 | 80 |
| 0815-0830 | 53 | 291 | 1 | 2 | 0 | 0 | 5 | 433 | 35 | 35 | 1 | 89 |
| 0830-0845 | 48 | 347 | 0 | 2 | 1 | 0 | 4 | 360 | 26 | 37 | 0 | 83 |
| 0845-0900 | 55 | 303 | 1 | 2 | 0 | 0 | 6 | 359 | 29 | 33 | 0 | 77 |
| 0900-0915 | 48 | 299 | 1 | 2 | 1 | 0 | 5 | 373 | 20 | 34 | 1 | 68 |
| 0915-0930 | 47 | 327 | 1 | 6 | 2 | 0 | 3 | 442 | 17 | 29 | 2 | 57 |
| 0930-0945 | 35 | 301 | 1 | 5 | 0 | 0 | 6 | 361 | 15 | 27 | 0 | 62 |
| 0945-1000 | 33 | 311 | 2 | 4 | 0 | 1 | 2 | 304 | 12 | 24 | 2 | 53 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 132 | 738 | 3 | 2 | 1 | 1 | 30 | 1367 | 92 | 105 | 1 | 251 | 2723 |
| 0715-0815 | 171 | 872 | 4 | 3 | 1 | 2 | 29 | 1456 | 107 | 115 | 1 | 293 | 3054 |
| 0730-0830 | 197 | 984 | 3 | 4 | 1 | 1 | 23 | 1563 | 118 | 124 | 1 | 324 | 3343 |
| 0745-0845 | 206 | 1114 | 3 | 5 | 2 | 1 | 21 | 1572 | 117 | 134 | 1 | 335 | 3511 |
| 0800-0900 | 213 | 1187 | 3 | 7 | 1 | 1 | 21 | 1524 | 123 | 137 | 1 | 329 | 3547 |
| 0815-0915 | 204 | 1240 | 3 | 8 | 2 | 0 | 20 | 1525 | 110 | 139 | 2 | 317 | 3570 |
| 0830-0930 | 198 | 1276 | 3 | 12 | 4 | 0 | 18 | 1534 | 92 | 133 | 3 | 285 | 3558 |
| 0845-0945 | 185 | 1230 | 4 | 15 | 3 | 0 | 20 | 1535 | 81 | 123 | 3 | 264 | 3463 |
| 0900-1000 | 163 | 1238 | 5 | 17 | 3 | 1 | 16 | 1480 | 64 | 114 | 5 | 240 | 3346 |

A.M. PEAK HOUR
0815-0915





DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

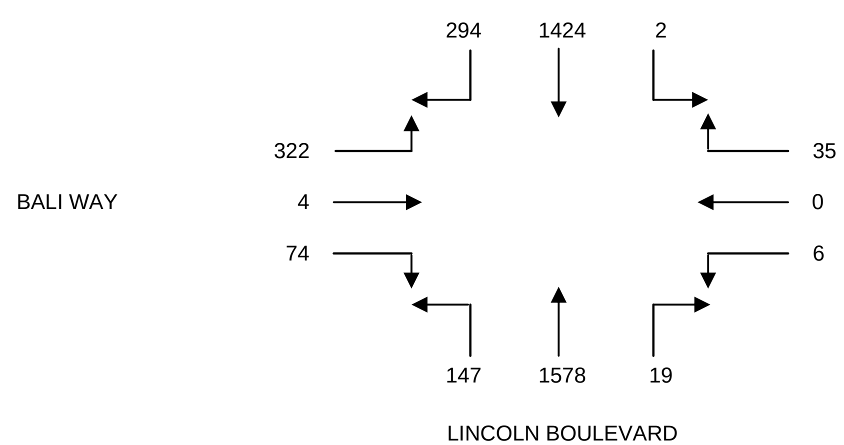
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S LINCOLN BOULEVARD
E/W BALI WAY
FILE NUMBER: 15-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 35 | 265 | 3 | 2 | 0 | 1 | 2 | 342 | 23 | 11 | 0 | 71 |
| 0415-0430 | 57 | 341 | 2 | 3 | 0 | 0 | 5 | 381 | 30 | 21 | 1 | 80 |
| 0430-0445 | 63 | 343 | 2 | 3 | 0 | 2 | 2 | 366 | 40 | 20 | 0 | 73 |
| 0445-0500 | 84 | 413 | 1 | 7 | 0 | 2 | 6 | 415 | 42 | 21 | 1 | 83 |
| 0500-0515 | 60 | 338 | 1 | 11 | 0 | 3 | 3 | 364 | 31 | 19 | 0 | 71 |
| 0515-0530 | 83 | 349 | 0 | 10 | 0 | 1 | 4 | 386 | 37 | 15 | 1 | 80 |
| 0530-0545 | 67 | 324 | 0 | 7 | 0 | 0 | 6 | 413 | 37 | 19 | 2 | 88 |
| 0545-0600 | 64 | 424 | 2 | 8 | 2 | 0 | 2 | 392 | 39 | 18 | 1 | 76 |
| 0600-0615 | 54 | 355 | 2 | 4 | 0 | 0 | 2 | 399 | 44 | 11 | 0 | 68 |
| 0615-0630 | 57 | 320 | 0 | 3 | 0 | 0 | 3 | 357 | 37 | 14 | 0 | 68 |
| 0630-0645 | 68 | 333 | 1 | 6 | 0 | 0 | 1 | 405 | 41 | 18 | 0 | 51 |
| 0645-0700 | 53 | 346 | 0 | 7 | 0 | 0 | 3 | 356 | 37 | 13 | 0 | 60 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 239 | 1362 | 8 | 15 | 0 | 5 | 15 | 1504 | 135 | 73 | 2 | 307 | 3665 |
| 0415-0515 | 264 | 1435 | 6 | 24 | 0 | 7 | 16 | 1526 | 143 | 81 | 2 | 307 | 3811 |
| 0430-0530 | 290 | 1443 | 4 | 31 | 0 | 8 | 15 | 1531 | 150 | 75 | 2 | 307 | 3856 |
| 0445-0545 | 294 | 1424 | 2 | 35 | 0 | 6 | 19 | 1578 | 147 | 74 | 4 | 322 | 3905 |
| 0500-0600 | 274 | 1435 | 3 | 36 | 2 | 4 | 15 | 1555 | 144 | 71 | 4 | 315 | 3858 |
| 0515-0615 | 268 | 1452 | 4 | 29 | 2 | 1 | 14 | 1590 | 157 | 63 | 4 | 312 | 3896 |
| 0530-0630 | 242 | 1423 | 4 | 22 | 2 | 0 | 13 | 1561 | 157 | 62 | 3 | 300 | 3789 |
| 0545-0645 | 243 | 1432 | 5 | 21 | 2 | 0 | 8 | 1553 | 161 | 61 | 1 | 263 | 3750 |
| 0600-0700 | 232 | 1354 | 3 | 20 | 0 | 0 | 9 | 1517 | 159 | 56 | 0 | 247 | 3597 |

P.M. PEAK HOUR
0445-0545




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

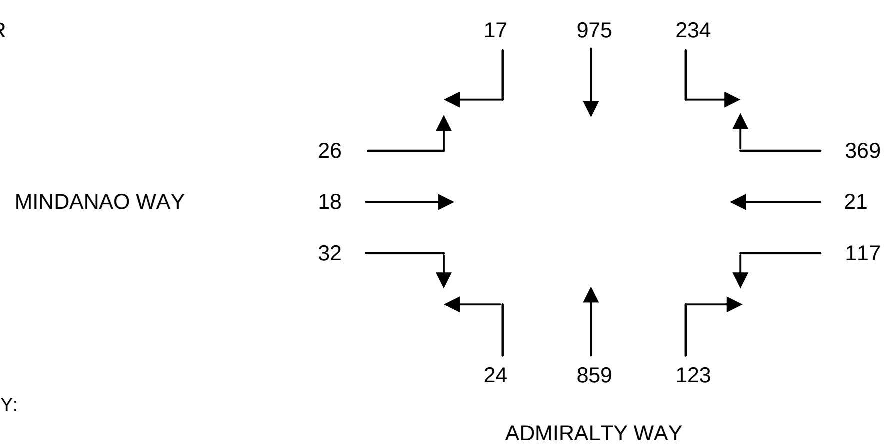
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY, DECEMBER 15, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S ADMIRALTY WAY
E/W MINDANAO WAY
FILE NUMBER: 16-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 4 | 110 | 35 | 64 | 5 | 21 | 10 | 120 | 2 | 2 | 4 | 1 |
| 0715-0730 | 5 | 169 | 43 | 75 | 2 | 40 | 18 | 164 | 2 | 5 | 3 | 3 |
| 0730-0745 | 3 | 191 | 50 | 88 | 3 | 32 | 23 | 207 | 7 | 7 | 5 | 6 |
| 0745-0800 | 5 | 223 | 57 | 91 | 5 | 28 | 34 | 220 | 6 | 10 | 7 | 12 |
| 0800-0815 | 4 | 243 | 55 | 94 | 3 | 22 | 30 | 219 | 5 | 8 | 5 | 6 |
| 0815-0830 | 3 | 251 | 65 | 96 | 5 | 37 | 29 | 207 | 4 | 7 | 3 | 4 |
| 0830-0845 | 5 | 258 | 57 | 88 | 8 | 30 | 30 | 213 | 9 | 7 | 3 | 4 |
| 0845-0900 | 3 | 240 | 43 | 96 | 6 | 33 | 24 | 216 | 5 | 8 | 4 | 7 |
| 0900-0915 | 5 | 224 | 40 | 80 | 10 | 51 | 27 | 214 | 2 | 4 | 2 | 4 |
| 0915-0930 | 3 | 217 | 30 | 66 | 8 | 58 | 18 | 213 | 3 | 6 | 3 | 4 |
| 0930-0945 | 2 | 207 | 27 | 73 | 9 | 45 | 20 | 198 | 7 | 9 | 3 | 3 |
| 0945-1000 | 1 | 169 | 23 | 67 | 8 | 47 | 17 | 177 | 7 | 7 | 1 | 3 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 17 | 693 | 185 | 318 | 15 | 121 | 85 | 711 | 17 | 24 | 19 | 22 | 2227 |
| 0715-0815 | 17 | 826 | 205 | 348 | 13 | 122 | 105 | 810 | 20 | 30 | 20 | 27 | 2543 |
| 0730-0830 | 15 | 908 | 227 | 369 | 16 | 119 | 116 | 853 | 22 | 32 | 20 | 28 | 2725 |
| 0745-0845 | 17 | 975 | 234 | 369 | 21 | 117 | 123 | 859 | 24 | 32 | 18 | 26 | 2815 |
| 0800-0900 | 15 | 992 | 220 | 374 | 22 | 122 | 113 | 855 | 23 | 30 | 15 | 21 | 2802 |
| 0815-0915 | 16 | 973 | 205 | 360 | 29 | 151 | 110 | 850 | 20 | 26 | 12 | 19 | 2771 |
| 0830-0930 | 16 | 939 | 170 | 330 | 32 | 172 | 99 | 856 | 19 | 25 | 12 | 19 | 2689 |
| 0845-0945 | 13 | 888 | 140 | 315 | 33 | 187 | 89 | 841 | 17 | 27 | 12 | 18 | 2580 |
| 0900-1000 | 11 | 817 | 120 | 286 | 35 | 201 | 82 | 802 | 19 | 26 | 9 | 14 | 2422 |

A.M. PEAK HOUR
0745-0845




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

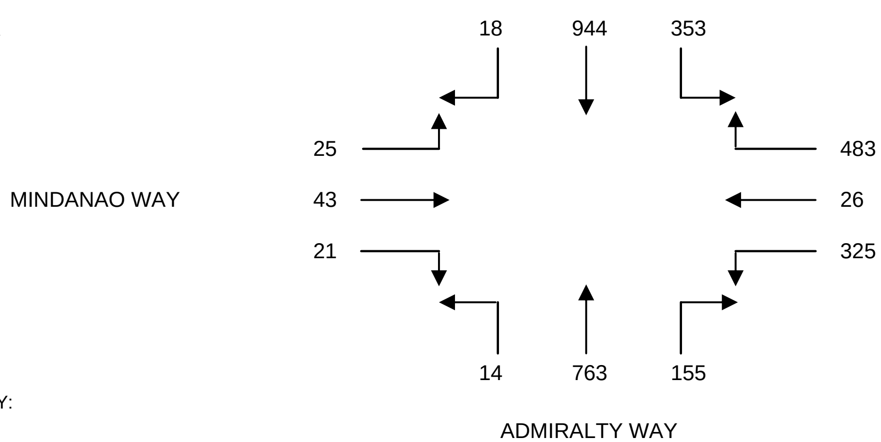
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY, DECEMBER 15, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | ADMIRALTY WAY |
| | E/W | MINDANAO WAY |
| FILE NUMBER: | | 16-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 3 | 233 | 57 | 90 | 12 | 95 | 30 | 179 | 9 | 3 | 9 | 5 |
| 0415-0430 | 4 | 207 | 78 | 90 | 10 | 76 | 40 | 183 | 8 | 8 | 6 | 5 |
| 0430-0445 | 4 | 211 | 70 | 107 | 7 | 81 | 50 | 197 | 6 | 7 | 8 | 4 |
| 0445-0500 | 5 | 229 | 81 | 108 | 5 | 64 | 48 | 185 | 3 | 7 | 8 | 3 |
| 0500-0515 | 3 | 240 | 95 | 112 | 11 | 87 | 39 | 195 | 3 | 4 | 13 | 5 |
| 0515-0530 | 7 | 253 | 104 | 125 | 6 | 98 | 34 | 207 | 5 | 5 | 10 | 10 |
| 0530-0545 | 3 | 222 | 73 | 138 | 4 | 76 | 34 | 176 | 3 | 5 | 12 | 7 |
| 0545-0600 | 3 | 213 | 79 | 111 | 4 | 88 | 33 | 164 | 4 | 3 | 5 | 3 |
| 0600-0615 | 8 | 257 | 84 | 100 | 8 | 97 | 37 | 226 | 2 | 2 | 6 | 7 |
| 0615-0630 | 7 | 249 | 64 | 119 | 13 | 104 | 40 | 178 | 1 | 3 | 13 | 3 |
| 0630-0645 | 7 | 211 | 53 | 110 | 13 | 88 | 40 | 140 | 2 | 2 | 11 | 4 |
| 0645-0700 | 5 | 177 | 41 | 92 | 17 | 84 | 36 | 136 | 2 | 3 | 11 | 3 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 16 | 880 | 286 | 395 | 34 | 316 | 168 | 744 | 26 | 25 | 31 | 17 | 2938 |
| 0415-0515 | 16 | 887 | 324 | 417 | 33 | 308 | 177 | 760 | 20 | 26 | 35 | 17 | 3020 |
| 0430-0530 | 19 | 933 | 350 | 452 | 29 | 330 | 171 | 784 | 17 | 23 | 39 | 22 | 3169 |
| 0445-0545 | 18 | 944 | 353 | 483 | 26 | 325 | 155 | 763 | 14 | 21 | 43 | 25 | 3170 |
| 0500-0600 | 16 | 928 | 351 | 486 | 25 | 349 | 140 | 742 | 15 | 17 | 40 | 25 | 3134 |
| 0515-0615 | 21 | 945 | 340 | 474 | 22 | 359 | 138 | 773 | 14 | 15 | 33 | 27 | 3161 |
| 0530-0630 | 21 | 941 | 300 | 468 | 29 | 365 | 144 | 744 | 10 | 13 | 36 | 20 | 3091 |
| 0545-0645 | 25 | 930 | 280 | 440 | 38 | 377 | 150 | 708 | 9 | 10 | 35 | 17 | 3019 |
| 0600-0700 | 27 | 894 | 242 | 421 | 51 | 373 | 153 | 680 | 7 | 10 | 41 | 17 | 2916 |

P.M. PEAK HOUR
0445-0545




DATA PROVIDED BY:

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91005
PH: 626-446-7978
FAX: 626-446-2877
.

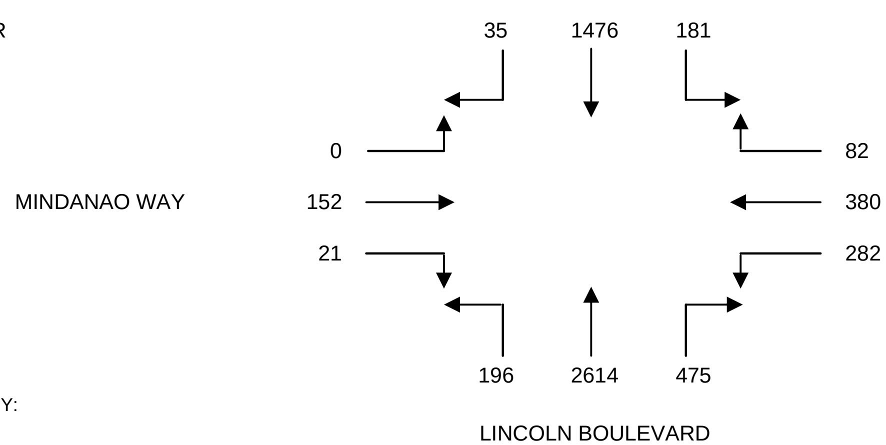
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY DECEMBER 8, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S LINCOLN BOULEVARD
E/W MINDANAO WAY
FILE NUMBER: 17-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 6 | 139 | 12 | 6 | 54 | 33 | 76 | 396 | 23 | 7 | 52 | 0 |
| 0715-0730 | 4 | 176 | 18 | 8 | 66 | 46 | 82 | 462 | 25 | 3 | 45 | 0 |
| 0730-0745 | 2 | 187 | 46 | 9 | 81 | 63 | 112 | 576 | 39 | 5 | 53 | 0 |
| 0745-0800 | 5 | 358 | 41 | 17 | 89 | 70 | 121 | 643 | 53 | 6 | 37 | 0 |
| 0800-0815 | 6 | 409 | 47 | 19 | 85 | 76 | 109 | 662 | 51 | 2 | 34 | 0 |
| 0815-0830 | 9 | 318 | 45 | 20 | 92 | 71 | 118 | 678 | 42 | 6 | 38 | 0 |
| 0830-0845 | 15 | 391 | 48 | 26 | 114 | 65 | 127 | 631 | 50 | 7 | 43 | 0 |
| 0845-0900 | 3 | 374 | 56 | 21 | 110 | 76 | 98 | 550 | 42 | 9 | 37 | 0 |
| 0900-0915 | 9 | 299 | 49 | 25 | 103 | 72 | 128 | 503 | 42 | 10 | 38 | 0 |
| 0915-0930 | 18 | 310 | 52 | 20 | 87 | 55 | 107 | 444 | 34 | 12 | 39 | 0 |
| 0930-0945 | 13 | 339 | 47 | 17 | 94 | 63 | 121 | 391 | 40 | 14 | 30 | 0 |
| 0945-1000 | 18 | 332 | 49 | 15 | 98 | 69 | 103 | 415 | 36 | 9 | 35 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 17 | 860 | 117 | 40 | 290 | 212 | 391 | 2077 | 140 | 21 | 187 | 0 | 4352 |
| 0715-0815 | 17 | 1130 | 152 | 53 | 321 | 255 | 424 | 2343 | 168 | 16 | 169 | 0 | 5048 |
| 0730-0830 | 22 | 1272 | 179 | 65 | 347 | 280 | 460 | 2559 | 185 | 19 | 162 | 0 | 5550 |
| 0745-0845 | 35 | 1476 | 181 | 82 | 380 | 282 | 475 | 2614 | 196 | 21 | 152 | 0 | 5894 |
| 0800-0900 | 33 | 1492 | 196 | 86 | 401 | 288 | 452 | 2521 | 185 | 24 | 152 | 0 | 5830 |
| 0815-0915 | 36 | 1382 | 198 | 92 | 419 | 284 | 471 | 2362 | 176 | 32 | 156 | 0 | 5608 |
| 0830-0930 | 45 | 1374 | 205 | 92 | 414 | 268 | 460 | 2128 | 168 | 38 | 157 | 0 | 5349 |
| 0845-0945 | 43 | 1322 | 204 | 83 | 394 | 266 | 454 | 1888 | 158 | 45 | 144 | 0 | 5001 |
| 0900-1000 | 58 | 1280 | 197 | 77 | 382 | 259 | 459 | 1753 | 152 | 45 | 142 | 0 | 4804 |

A.M. PEAK HOUR
0745-0845




DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

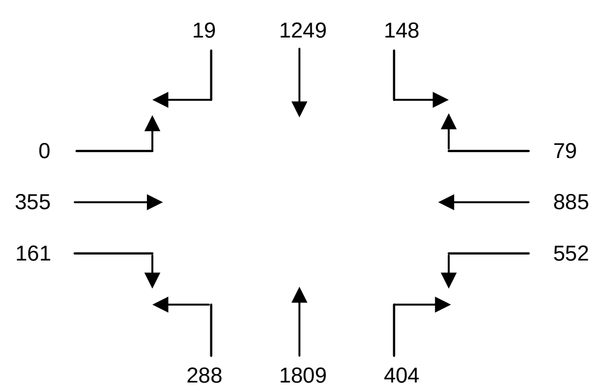
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY DECEMBER 8, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | LINCOLN BOULEVARD |
| | E/W | MINDANAO WAY |
| FILE NUMBER: | | 17-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 8 | 258 | 30 | 15 | 104 | 104 | 101 | 327 | 15 | 24 | 111 | 0 |
| 0415-0430 | 10 | 352 | 31 | 17 | 117 | 112 | 110 | 393 | 36 | 42 | 112 | 0 |
| 0430-0445 | 18 | 335 | 33 | 18 | 143 | 99 | 120 | 430 | 30 | 22 | 96 | 0 |
| 0445-0500 | 6 | 283 | 40 | 17 | 156 | 116 | 77 | 408 | 44 | 46 | 123 | 0 |
| 0500-0515 | 8 | 309 | 41 | 13 | 182 | 134 | 108 | 427 | 71 | 30 | 102 | 0 |
| 0515-0530 | 7 | 274 | 36 | 20 | 214 | 145 | 106 | 449 | 39 | 34 | 92 | 0 |
| 0530-0545 | 4 | 304 | 39 | 25 | 235 | 152 | 96 | 493 | 97 | 53 | 86 | 0 |
| 0545-0600 | 0 | 362 | 32 | 21 | 254 | 121 | 94 | 440 | 81 | 44 | 75 | 0 |
| 0600-0615 | 1 | 294 | 25 | 12 | 239 | 139 | 79 | 451 | 42 | 47 | 89 | 0 |
| 0615-0630 | 3 | 267 | 22 | 5 | 215 | 154 | 86 | 413 | 29 | 28 | 91 | 0 |
| 0630-0645 | 9 | 295 | 29 | 7 | 188 | 119 | 71 | 365 | 26 | 47 | 82 | 0 |
| 0645-0700 | 5 | 319 | 13 | 6 | 174 | 102 | 79 | 341 | 47 | 41 | 76 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 42 | 1228 | 134 | 67 | 520 | 431 | 408 | 1558 | 125 | 134 | 442 | 0 | 5089 |
| 0415-0515 | 42 | 1279 | 145 | 65 | 598 | 461 | 415 | 1658 | 181 | 140 | 433 | 0 | 5417 |
| 0430-0530 | 39 | 1201 | 150 | 68 | 695 | 494 | 411 | 1714 | 184 | 132 | 413 | 0 | 5501 |
| 0445-0545 | 25 | 1170 | 156 | 75 | 787 | 547 | 387 | 1777 | 251 | 163 | 403 | 0 | 5741 |
| 0500-0600 | 19 | 1249 | 148 | 79 | 885 | 552 | 404 | 1809 | 288 | 161 | 355 | 0 | 5949 |
| 0515-0615 | 12 | 1234 | 132 | 78 | 942 | 557 | 375 | 1833 | 259 | 178 | 342 | 0 | 5942 |
| 0530-0630 | 8 | 1227 | 118 | 63 | 943 | 566 | 355 | 1797 | 249 | 172 | 341 | 0 | 5839 |
| 0545-0645 | 13 | 1218 | 108 | 45 | 896 | 533 | 330 | 1669 | 178 | 166 | 337 | 0 | 5493 |
| 0600-0700 | 18 | 1175 | 89 | 30 | 816 | 514 | 315 | 1570 | 144 | 163 | 338 | 0 | 5172 |

P.M. PEAK HOUR
0500-0600

MINDANAO WAY




LINCOLN BOULEVARD

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

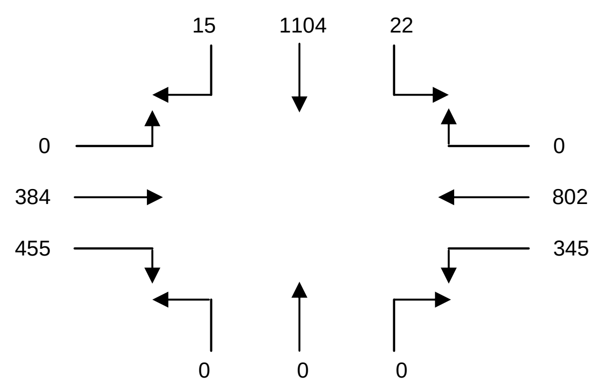
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: TUESDAY DECEMBER 13, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S MARINA EXPRESSWAY (EASTBOUND)
E/W MINDANAO WAY
FILE NUMBER: 18-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 2 | 207 | 1 | 0 | 93 | 34 | 0 | 0 | 0 | 111 | 37 | 0 |
| 0715-0730 | 1 | 223 | 1 | 0 | 126 | 50 | 0 | 0 | 0 | 95 | 54 | 0 |
| 0730-0745 | 1 | 255 | 2 | 0 | 157 | 77 | 0 | 0 | 0 | 129 | 90 | 0 |
| 0745-0800 | 0 | 270 | 4 | 0 | 172 | 90 | 0 | 0 | 0 | 124 | 81 | 0 |
| 0800-0815 | 2 | 286 | 6 | 0 | 185 | 81 | 0 | 0 | 0 | 110 | 76 | 0 |
| 0815-0830 | 3 | 306 | 7 | 0 | 182 | 88 | 0 | 0 | 0 | 116 | 92 | 0 |
| 0830-0845 | 2 | 269 | 6 | 0 | 209 | 90 | 0 | 0 | 0 | 124 | 100 | 0 |
| 0845-0900 | 5 | 274 | 3 | 0 | 210 | 95 | 0 | 0 | 0 | 100 | 89 | 0 |
| 0900-0915 | 5 | 255 | 6 | 0 | 201 | 72 | 0 | 0 | 0 | 115 | 103 | 0 |
| 0915-0930 | 3 | 284 | 5 | 0 | 165 | 79 | 0 | 0 | 0 | 103 | 88 | 0 |
| 0930-0945 | 3 | 242 | 4 | 0 | 176 | 63 | 0 | 0 | 0 | 104 | 102 | 0 |
| 0945-1000 | 3 | 211 | 7 | 0 | 173 | 66 | 0 | 0 | 0 | 94 | 96 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 4 | 955 | 8 | 0 | 548 | 251 | 0 | 0 | 0 | 459 | 262 | 0 | 2487 |
| 0715-0815 | 4 | 1034 | 13 | 0 | 640 | 298 | 0 | 0 | 0 | 458 | 301 | 0 | 2748 |
| 0730-0830 | 6 | 1117 | 19 | 0 | 696 | 336 | 0 | 0 | 0 | 479 | 339 | 0 | 2992 |
| 0745-0845 | 7 | 1131 | 23 | 0 | 748 | 349 | 0 | 0 | 0 | 474 | 349 | 0 | 3081 |
| 0800-0900 | 12 | 1135 | 22 | 0 | 786 | 354 | 0 | 0 | 0 | 450 | 357 | 0 | 3116 |
| 0815-0915 | 15 | 1104 | 22 | 0 | 802 | 345 | 0 | 0 | 0 | 455 | 384 | 0 | 3127 |
| 0830-0930 | 15 | 1082 | 20 | 0 | 785 | 336 | 0 | 0 | 0 | 442 | 380 | 0 | 3060 |
| 0845-0945 | 16 | 1055 | 18 | 0 | 752 | 309 | 0 | 0 | 0 | 422 | 382 | 0 | 2954 |
| 0900-1000 | 14 | 992 | 22 | 0 | 715 | 280 | 0 | 0 | 0 | 416 | 389 | 0 | 2828 |

A.M. PEAK HOUR
0815-0915

MINDANAO WAY




MARINA EXPRESSWAY (EASTBOUND)


DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

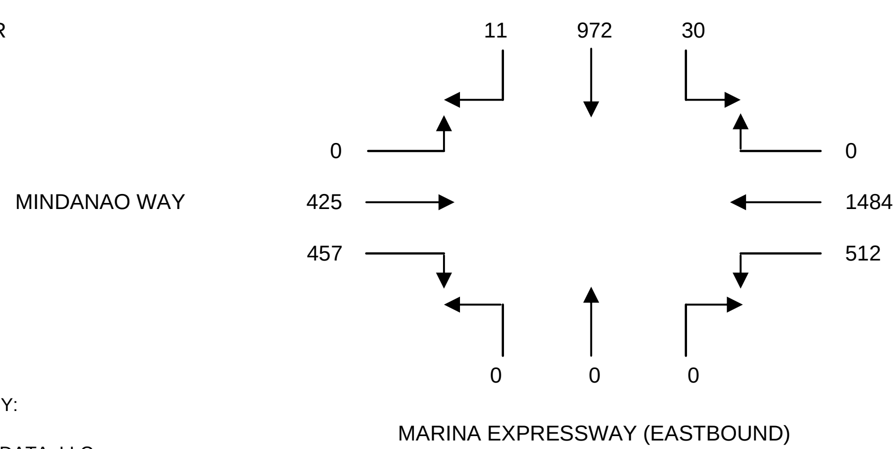
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: TUESDAY DECEMBER 13, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S MARINA EXPRESSWAY (EASTBOUND)
E/W MINDANAO WAY
FILE NUMBER: 18-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 3 | 231 | 3 | 0 | 228 | 105 | 0 | 0 | 0 | 140 | 108 | 0 |
| 0415-0430 | 3 | 241 | 5 | 0 | 237 | 118 | 0 | 0 | 0 | 124 | 127 | 0 |
| 0430-0445 | 1 | 228 | 4 | 0 | 254 | 127 | 0 | 0 | 0 | 146 | 104 | 0 |
| 0445-0500 | 6 | 248 | 3 | 0 | 274 | 123 | 0 | 0 | 0 | 131 | 103 | 0 |
| 0500-0515 | 4 | 249 | 7 | 0 | 318 | 134 | 0 | 0 | 0 | 126 | 117 | 0 |
| 0515-0530 | 3 | 247 | 5 | 0 | 371 | 130 | 0 | 0 | 0 | 122 | 106 | 0 |
| 0530-0545 | 1 | 244 | 10 | 0 | 406 | 134 | 0 | 0 | 0 | 113 | 103 | 0 |
| 0545-0600 | 3 | 232 | 8 | 0 | 389 | 114 | 0 | 0 | 0 | 96 | 99 | 0 |
| 0600-0615 | 1 | 220 | 4 | 0 | 386 | 128 | 0 | 0 | 0 | 109 | 87 | 0 |
| 0615-0630 | 4 | 227 | 5 | 0 | 362 | 112 | 0 | 0 | 0 | 108 | 83 | 0 |
| 0630-0645 | 0 | 219 | 5 | 0 | 308 | 117 | 0 | 0 | 0 | 95 | 90 | 0 |
| 0645-0700 | 3 | 172 | 2 | 0 | 287 | 126 | 0 | 0 | 0 | 92 | 78 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 13 | 948 | 15 | 0 | 993 | 473 | 0 | 0 | 0 | 541 | 442 | 0 | 3425 |
| 0415-0515 | 14 | 966 | 19 | 0 | 1083 | 502 | 0 | 0 | 0 | 527 | 451 | 0 | 3562 |
| 0430-0530 | 14 | 972 | 19 | 0 | 1217 | 514 | 0 | 0 | 0 | 525 | 430 | 0 | 3691 |
| 0445-0545 | 14 | 988 | 25 | 0 | 1369 | 521 | 0 | 0 | 0 | 492 | 429 | 0 | 3838 |
| 0500-0600 | 11 | 972 | 30 | 0 | 1484 | 512 | 0 | 0 | 0 | 457 | 425 | 0 | 3891 |
| 0515-0615 | 8 | 943 | 27 | 0 | 1552 | 506 | 0 | 0 | 0 | 440 | 395 | 0 | 3871 |
| 0530-0630 | 9 | 923 | 27 | 0 | 1543 | 488 | 0 | 0 | 0 | 426 | 372 | 0 | 3788 |
| 0545-0645 | 8 | 898 | 22 | 0 | 1445 | 471 | 0 | 0 | 0 | 408 | 359 | 0 | 3611 |
| 0600-0700 | 8 | 838 | 16 | 0 | 1343 | 483 | 0 | 0 | 0 | 404 | 338 | 0 | 3430 |

P.M. PEAK HOUR
0500-0600




DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

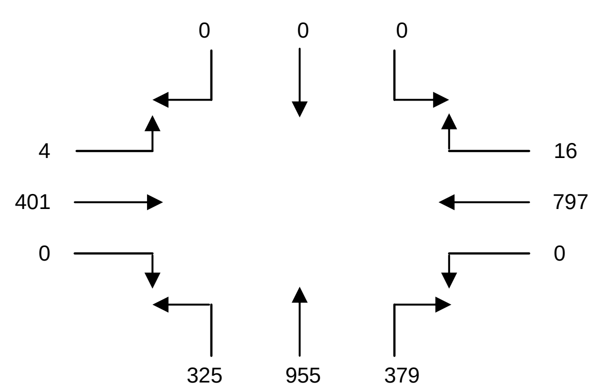
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY DECEMBER 8, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S MARINA EXPRESSWAY (WESTBOUND)
E/W MINDANAO WAY
FILE NUMBER: 19-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 0 | 0 | 0 | 4 | 67 | 0 | 45 | 179 | 52 | 0 | 35 | 0 |
| 0715-0730 | 0 | 0 | 0 | 3 | 106 | 0 | 90 | 211 | 65 | 0 | 47 | 0 |
| 0730-0745 | 0 | 0 | 0 | 2 | 152 | 0 | 109 | 223 | 74 | 0 | 85 | 3 |
| 0745-0800 | 0 | 0 | 0 | 3 | 191 | 0 | 119 | 221 | 66 | 0 | 86 | 1 |
| 0800-0815 | 0 | 0 | 0 | 4 | 166 | 0 | 96 | 195 | 94 | 0 | 84 | 1 |
| 0815-0830 | 0 | 0 | 0 | 5 | 187 | 0 | 89 | 220 | 77 | 0 | 105 | 0 |
| 0830-0845 | 0 | 0 | 0 | 1 | 219 | 0 | 85 | 252 | 73 | 0 | 104 | 1 |
| 0845-0900 | 0 | 0 | 0 | 7 | 207 | 0 | 96 | 229 | 92 | 0 | 94 | 1 |
| 0900-0915 | 0 | 0 | 0 | 3 | 184 | 0 | 109 | 254 | 83 | 0 | 98 | 2 |
| 0915-0930 | 0 | 0 | 0 | 4 | 169 | 0 | 112 | 217 | 69 | 0 | 96 | 2 |
| 0930-0945 | 0 | 0 | 0 | 5 | 157 | 0 | 102 | 228 | 76 | 0 | 96 | 5 |
| 0945-1000 | 0 | 0 | 0 | 7 | 153 | 0 | 91 | 244 | 78 | 0 | 100 | 2 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 0 | 0 | 0 | 12 | 516 | 0 | 363 | 834 | 257 | 0 | 253 | 4 | 2239 |
| 0715-0815 | 0 | 0 | 0 | 12 | 615 | 0 | 414 | 850 | 299 | 0 | 302 | 5 | 2497 |
| 0730-0830 | 0 | 0 | 0 | 14 | 696 | 0 | 413 | 859 | 311 | 0 | 360 | 5 | 2658 |
| 0745-0845 | 0 | 0 | 0 | 13 | 763 | 0 | 389 | 888 | 310 | 0 | 379 | 3 | 2745 |
| 0800-0900 | 0 | 0 | 0 | 17 | 779 | 0 | 366 | 896 | 336 | 0 | 387 | 3 | 2784 |
| 0815-0915 | 0 | 0 | 0 | 16 | 797 | 0 | 379 | 955 | 325 | 0 | 401 | 4 | 2877 |
| 0830-0930 | 0 | 0 | 0 | 15 | 779 | 0 | 402 | 952 | 317 | 0 | 392 | 6 | 2863 |
| 0845-0945 | 0 | 0 | 0 | 19 | 717 | 0 | 419 | 928 | 320 | 0 | 384 | 10 | 2797 |
| 0900-1000 | 0 | 0 | 0 | 19 | 663 | 0 | 414 | 943 | 306 | 0 | 390 | 11 | 2746 |

A.M. PEAK HOUR
0815-0915

MINDANAO WAY




MARINA EXPRESSWAY (WESTBOUND)

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

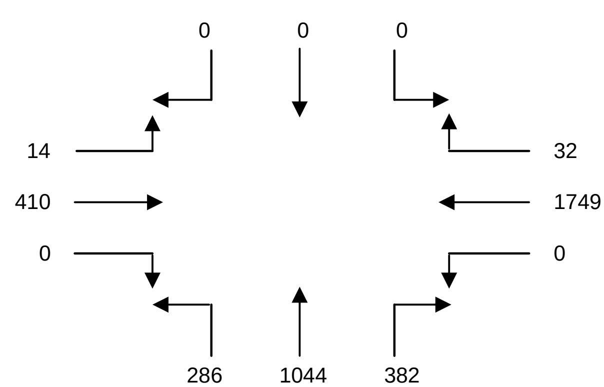
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY DECEMBER 8, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S MARINA EXPRESSWAY (WESTBOUND)
E/W MINDANAO WAY
FILE NUMBER: 19-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 0 | 0 | 0 | 5 | 245 | 0 | 76 | 189 | 83 | 0 | 99 | 5 |
| 0415-0430 | 0 | 0 | 0 | 14 | 251 | 0 | 66 | 204 | 99 | 0 | 127 | 1 |
| 0430-0445 | 0 | 0 | 0 | 14 | 259 | 0 | 87 | 234 | 113 | 0 | 113 | 3 |
| 0445-0500 | 0 | 0 | 0 | 17 | 284 | 0 | 116 | 263 | 107 | 0 | 98 | 2 |
| 0500-0515 | 0 | 0 | 0 | 5 | 358 | 0 | 101 | 239 | 89 | 0 | 119 | 9 |
| 0515-0530 | 0 | 0 | 0 | 9 | 434 | 0 | 118 | 268 | 62 | 0 | 100 | 8 |
| 0530-0545 | 0 | 0 | 0 | 6 | 458 | 0 | 93 | 254 | 74 | 0 | 105 | 1 |
| 0545-0600 | 0 | 0 | 0 | 12 | 429 | 0 | 96 | 251 | 69 | 0 | 111 | 4 |
| 0600-0615 | 0 | 0 | 0 | 5 | 428 | 0 | 75 | 271 | 81 | 0 | 94 | 1 |
| 0615-0630 | 0 | 0 | 0 | 4 | 397 | 0 | 80 | 276 | 73 | 0 | 79 | 1 |
| 0630-0645 | 0 | 0 | 0 | 9 | 349 | 0 | 78 | 309 | 68 | 0 | 90 | 2 |
| 0645-0700 | 0 | 0 | 0 | 5 | 328 | 0 | 84 | 305 | 78 | 0 | 84 | 2 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 0 | 0 | 0 | 50 | 1039 | 0 | 345 | 890 | 402 | 0 | 437 | 11 | 3174 |
| 0415-0515 | 0 | 0 | 0 | 50 | 1152 | 0 | 370 | 940 | 408 | 0 | 457 | 15 | 3392 |
| 0430-0530 | 0 | 0 | 0 | 45 | 1335 | 0 | 422 | 1004 | 371 | 0 | 430 | 22 | 3629 |
| 0445-0545 | 0 | 0 | 0 | 37 | 1534 | 0 | 428 | 1024 | 332 | 0 | 422 | 20 | 3797 |
| 0500-0600 | 0 | 0 | 0 | 32 | 1679 | 0 | 408 | 1012 | 294 | 0 | 435 | 22 | 3882 |
| 0515-0615 | 0 | 0 | 0 | 32 | 1749 | 0 | 382 | 1044 | 286 | 0 | 410 | 14 | 3917 |
| 0530-0630 | 0 | 0 | 0 | 27 | 1712 | 0 | 344 | 1052 | 297 | 0 | 389 | 7 | 3828 |
| 0545-0645 | 0 | 0 | 0 | 30 | 1603 | 0 | 329 | 1107 | 291 | 0 | 374 | 8 | 3742 |
| 0600-0700 | 0 | 0 | 0 | 23 | 1502 | 0 | 317 | 1161 | 300 | 0 | 347 | 6 | 3656 |

P.M. PEAK HOUR
0515-0615

MINDANAO WAY




MARINA EXPRESSWAY (WESTBOUND)


DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

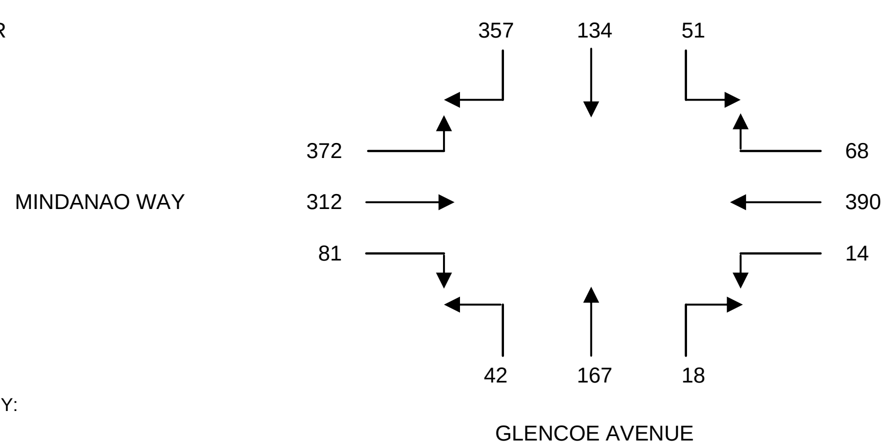
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | TUESDAY DECEMBER 13, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | GLENCOE AVENUE |
| | E/W | MINDANAO WAY |
| FILE NUMBER: | | 20-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 40 | 12 | 7 | 8 | 25 | 1 | 0 | 19 | 5 | 6 | 24 | 52 |
| 0715-0730 | 47 | 17 | 9 | 18 | 59 | 2 | 1 | 30 | 4 | 9 | 56 | 65 |
| 0730-0745 | 68 | 22 | 17 | 13 | 74 | 0 | 4 | 38 | 6 | 18 | 68 | 103 |
| 0745-0800 | 89 | 28 | 13 | 19 | 95 | 2 | 2 | 44 | 5 | 24 | 86 | 88 |
| 0800-0815 | 77 | 30 | 12 | 26 | 76 | 4 | 1 | 42 | 9 | 16 | 75 | 83 |
| 0815-0830 | 90 | 26 | 21 | 13 | 84 | 5 | 4 | 46 | 10 | 21 | 82 | 89 |
| 0830-0845 | 98 | 45 | 11 | 20 | 103 | 2 | 6 | 48 | 14 | 17 | 67 | 101 |
| 0845-0900 | 89 | 38 | 8 | 18 | 109 | 5 | 2 | 40 | 11 | 23 | 78 | 85 |
| 0900-0915 | 80 | 25 | 11 | 17 | 94 | 2 | 6 | 33 | 7 | 20 | 85 | 97 |
| 0915-0930 | 72 | 33 | 13 | 22 | 88 | 3 | 3 | 37 | 9 | 24 | 91 | 90 |
| 0930-0945 | 83 | 39 | 13 | 21 | 59 | 6 | 3 | 46 | 16 | 22 | 86 | 84 |
| 0945-1000 | 71 | 25 | 12 | 21 | 68 | 2 | 2 | 30 | 13 | 25 | 81 | 79 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 244 | 79 | 46 | 58 | 253 | 5 | 7 | 131 | 20 | 57 | 234 | 308 | 1442 |
| 0715-0815 | 281 | 97 | 51 | 76 | 304 | 8 | 8 | 154 | 24 | 67 | 285 | 339 | 1694 |
| 0730-0830 | 324 | 106 | 63 | 71 | 329 | 11 | 11 | 170 | 30 | 79 | 311 | 363 | 1868 |
| 0745-0845 | 354 | 129 | 57 | 78 | 358 | 13 | 13 | 180 | 38 | 78 | 310 | 361 | 1969 |
| 0800-0900 | 354 | 139 | 52 | 77 | 372 | 16 | 13 | 176 | 44 | 77 | 302 | 358 | 1980 |
| 0815-0915 | 357 | 134 | 51 | 68 | 390 | 14 | 18 | 167 | 42 | 81 | 312 | 372 | 2006 |
| 0830-0930 | 339 | 141 | 43 | 77 | 394 | 12 | 17 | 158 | 41 | 84 | 321 | 373 | 2000 |
| 0845-0945 | 324 | 135 | 45 | 78 | 350 | 16 | 14 | 156 | 43 | 89 | 340 | 356 | 1946 |
| 0900-1000 | 306 | 122 | 49 | 81 | 309 | 13 | 14 | 146 | 45 | 91 | 343 | 350 | 1869 |

A.M. PEAK HOUR
0815-0915




DATA PROVIDED BY:

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PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

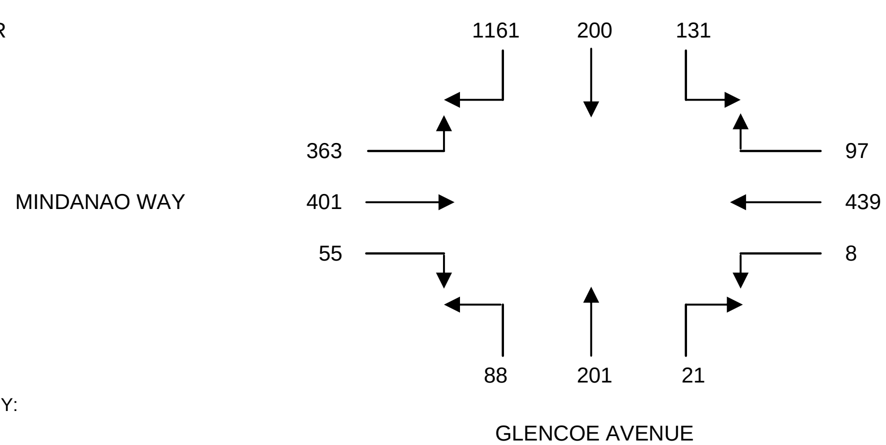
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | TUESDAY DECEMBER 13, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | GLENCOE AVENUE |
| | E/W | MINDANAO WAY |
| FILE NUMBER: | | 20-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 151 | 37 | 32 | 16 | 66 | 2 | 6 | 41 | 27 | 11 | 65 | 91 |
| 0415-0430 | 156 | 51 | 26 | 22 | 88 | 2 | 5 | 37 | 13 | 9 | 78 | 99 |
| 0430-0445 | 173 | 51 | 25 | 14 | 83 | 1 | 4 | 38 | 12 | 13 | 93 | 90 |
| 0445-0500 | 185 | 47 | 36 | 21 | 90 | 4 | 2 | 49 | 21 | 10 | 105 | 101 |
| 0500-0515 | 221 | 52 | 41 | 20 | 103 | 4 | 8 | 51 | 33 | 14 | 94 | 105 |
| 0515-0530 | 278 | 44 | 29 | 26 | 129 | 1 | 4 | 40 | 28 | 13 | 106 | 91 |
| 0530-0545 | 329 | 47 | 29 | 27 | 115 | 2 | 6 | 57 | 13 | 16 | 98 | 82 |
| 0545-0600 | 333 | 57 | 32 | 24 | 92 | 1 | 3 | 53 | 14 | 12 | 103 | 85 |
| 0600-0615 | 314 | 43 | 25 | 18 | 88 | 2 | 5 | 46 | 26 | 11 | 75 | 81 |
| 0615-0630 | 288 | 44 | 31 | 31 | 84 | 4 | 2 | 46 | 22 | 8 | 70 | 74 |
| 0630-0645 | 264 | 54 | 33 | 20 | 68 | 1 | 2 | 38 | 19 | 7 | 76 | 78 |
| 0645-0700 | 243 | 34 | 33 | 14 | 72 | 2 | 3 | 25 | 15 | 6 | 73 | 81 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 665 | 186 | 119 | 73 | 327 | 9 | 17 | 165 | 73 | 43 | 341 | 381 | 2399 |
| 0415-0515 | 735 | 201 | 128 | 77 | 364 | 11 | 19 | 175 | 79 | 46 | 370 | 395 | 2600 |
| 0430-0530 | 857 | 194 | 131 | 81 | 405 | 10 | 18 | 178 | 94 | 50 | 398 | 387 | 2803 |
| 0445-0545 | 1013 | 190 | 135 | 94 | 437 | 11 | 20 | 197 | 95 | 53 | 403 | 379 | 3027 |
| 0500-0600 | 1161 | 200 | 131 | 97 | 439 | 8 | 21 | 201 | 88 | 55 | 401 | 363 | 3165 |
| 0515-0615 | 1254 | 191 | 115 | 95 | 424 | 6 | 18 | 196 | 81 | 52 | 382 | 339 | 3153 |
| 0530-0630 | 1264 | 191 | 117 | 100 | 379 | 9 | 16 | 202 | 75 | 47 | 346 | 322 | 3068 |
| 0545-0645 | 1199 | 198 | 121 | 93 | 332 | 8 | 12 | 183 | 81 | 38 | 324 | 318 | 2907 |
| 0600-0700 | 1109 | 175 | 122 | 83 | 312 | 9 | 12 | 155 | 82 | 32 | 294 | 314 | 2699 |

P.M. PEAK HOUR
0500-0600





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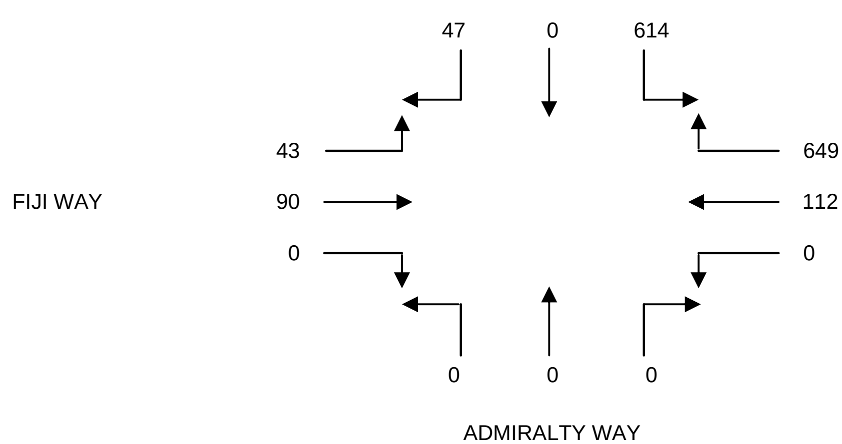
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY DECEMBER 8, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S ADMIRALTY WAY
E/W FIJI WAY
FILE NUMBER: 21-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 14 | 0 | 50 | 111 | 25 | 0 | 0 | 0 | 0 | 0 | 12 | 9 |
| 0715-0730 | 9 | 0 | 98 | 116 | 29 | 0 | 0 | 0 | 0 | 0 | 9 | 6 |
| 0730-0745 | 14 | 0 | 130 | 168 | 27 | 0 | 0 | 0 | 0 | 0 | 26 | 13 |
| 0745-0800 | 9 | 0 | 168 | 180 | 24 | 0 | 0 | 0 | 0 | 0 | 21 | 14 |
| 0800-0815 | 13 | 0 | 156 | 129 | 38 | 0 | 0 | 0 | 0 | 0 | 25 | 6 |
| 0815-0830 | 11 | 0 | 160 | 172 | 23 | 0 | 0 | 0 | 0 | 0 | 18 | 10 |
| 0830-0845 | 9 | 0 | 191 | 104 | 31 | 0 | 0 | 0 | 0 | 0 | 25 | 11 |
| 0845-0900 | 15 | 0 | 155 | 145 | 24 | 0 | 0 | 0 | 0 | 0 | 23 | 17 |
| 0900-0915 | 14 | 0 | 146 | 123 | 23 | 0 | 0 | 0 | 0 | 0 | 16 | 21 |
| 0915-0930 | 12 | 0 | 153 | 108 | 18 | 0 | 0 | 0 | 0 | 0 | 18 | 8 |
| 0930-0945 | 16 | 0 | 128 | 97 | 30 | 0 | 0 | 0 | 0 | 0 | 23 | 10 |
| 0945-1000 | 21 | 0 | 119 | 86 | 29 | 0 | 0 | 0 | 0 | 0 | 14 | 18 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 46 | 0 | 446 | 575 | 105 | 0 | 0 | 0 | 0 | 0 | 68 | 42 | 1282 |
| 0715-0815 | 45 | 0 | 552 | 593 | 118 | 0 | 0 | 0 | 0 | 0 | 81 | 39 | 1428 |
| 0730-0830 | 47 | 0 | 614 | 649 | 112 | 0 | 0 | 0 | 0 | 0 | 90 | 43 | 1555 |
| 0745-0845 | 42 | 0 | 675 | 585 | 116 | 0 | 0 | 0 | 0 | 0 | 89 | 41 | 1548 |
| 0800-0900 | 48 | 0 | 662 | 550 | 116 | 0 | 0 | 0 | 0 | 0 | 91 | 44 | 1511 |
| 0815-0915 | 49 | 0 | 652 | 544 | 101 | 0 | 0 | 0 | 0 | 0 | 82 | 59 | 1487 |
| 0830-0930 | 50 | 0 | 645 | 480 | 96 | 0 | 0 | 0 | 0 | 0 | 82 | 57 | 1410 |
| 0845-0945 | 57 | 0 | 582 | 473 | 95 | 0 | 0 | 0 | 0 | 0 | 80 | 56 | 1343 |
| 0900-1000 | 63 | 0 | 546 | 414 | 100 | 0 | 0 | 0 | 0 | 0 | 71 | 57 | 1251 |

A.M. PEAK HOUR
0730-0830




DATA PROVIDED BY:

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LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

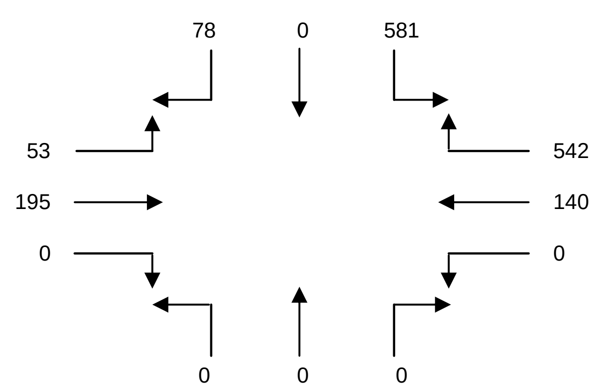
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY DECEMBER 8, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S ADMIRALTY WAY
E/W FIJI WAY
FILE NUMBER: 21-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 30 | 0 | 115 | 109 | 22 | 0 | 0 | 0 | 0 | 0 | 56 | 15 |
| 0415-0430 | 20 | 0 | 108 | 102 | 30 | 0 | 0 | 0 | 0 | 0 | 50 | 15 |
| 0430-0445 | 19 | 0 | 129 | 111 | 31 | 0 | 0 | 0 | 0 | 0 | 68 | 26 |
| 0445-0500 | 22 | 0 | 131 | 151 | 31 | 0 | 0 | 0 | 0 | 0 | 54 | 16 |
| 0500-0515 | 17 | 0 | 172 | 102 | 34 | 0 | 0 | 0 | 0 | 0 | 46 | 8 |
| 0515-0530 | 21 | 0 | 135 | 133 | 35 | 0 | 0 | 0 | 0 | 0 | 51 | 20 |
| 0530-0545 | 18 | 0 | 143 | 156 | 40 | 0 | 0 | 0 | 0 | 0 | 44 | 9 |
| 0545-0600 | 22 | 0 | 145 | 121 | 44 | 0 | 0 | 0 | 0 | 0 | 36 | 12 |
| 0600-0615 | 18 | 0 | 132 | 156 | 33 | 0 | 0 | 0 | 0 | 0 | 49 | 13 |
| 0615-0630 | 19 | 0 | 139 | 141 | 30 | 0 | 0 | 0 | 0 | 0 | 31 | 7 |
| 0630-0645 | 14 | 0 | 151 | 123 | 37 | 0 | 0 | 0 | 0 | 0 | 41 | 9 |
| 0645-0700 | 17 | 0 | 142 | 127 | 26 | 0 | 0 | 0 | 0 | 0 | 38 | 15 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 91 | 0 | 483 | 473 | 114 | 0 | 0 | 0 | 0 | 0 | 228 | 72 | 1461 |
| 0415-0515 | 78 | 0 | 540 | 466 | 126 | 0 | 0 | 0 | 0 | 0 | 218 | 65 | 1493 |
| 0430-0530 | 79 | 0 | 567 | 497 | 131 | 0 | 0 | 0 | 0 | 0 | 219 | 70 | 1563 |
| 0445-0545 | 78 | 0 | 581 | 542 | 140 | 0 | 0 | 0 | 0 | 0 | 195 | 53 | 1589 |
| 0500-0600 | 78 | 0 | 595 | 512 | 153 | 0 | 0 | 0 | 0 | 0 | 177 | 49 | 1564 |
| 0515-0615 | 79 | 0 | 555 | 566 | 152 | 0 | 0 | 0 | 0 | 0 | 180 | 54 | 1586 |
| 0530-0630 | 77 | 0 | 559 | 574 | 147 | 0 | 0 | 0 | 0 | 0 | 160 | 41 | 1558 |
| 0545-0645 | 73 | 0 | 567 | 541 | 144 | 0 | 0 | 0 | 0 | 0 | 157 | 41 | 1523 |
| 0600-0700 | 68 | 0 | 564 | 547 | 126 | 0 | 0 | 0 | 0 | 0 | 159 | 44 | 1508 |

P.M. PEAK HOUR
0445-0545

FIJI WAY




ADMIRALTY WAY

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

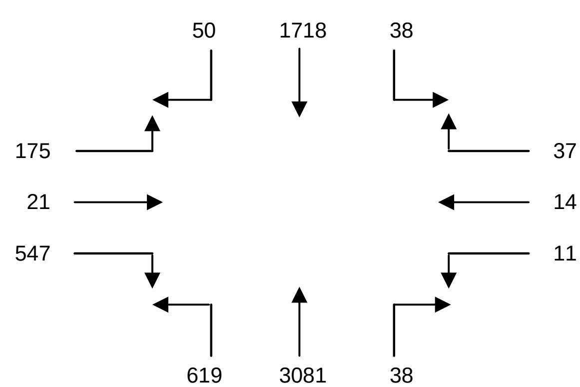
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | TUESDAY DECEMBER 13, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | LINCOLN BOULEVARD |
| | E/W | FIJI WAY |
| FILE NUMBER: | | 22-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 17 | 166 | 3 | 2 | 2 | 1 | 9 | 493 | 110 | 55 | 2 | 8 |
| 0715-0730 | 11 | 215 | 6 | 5 | 3 | 2 | 4 | 548 | 126 | 84 | 3 | 23 |
| 0730-0745 | 7 | 248 | 5 | 9 | 4 | 4 | 6 | 691 | 177 | 117 | 5 | 33 |
| 0745-0800 | 13 | 418 | 8 | 8 | 5 | 2 | 8 | 776 | 181 | 144 | 5 | 37 |
| 0800-0815 | 10 | 480 | 5 | 10 | 4 | 4 | 11 | 784 | 147 | 132 | 7 | 35 |
| 0815-0830 | 11 | 385 | 6 | 12 | 2 | 3 | 10 | 772 | 178 | 119 | 5 | 46 |
| 0830-0845 | 16 | 435 | 19 | 7 | 3 | 2 | 9 | 749 | 113 | 152 | 4 | 57 |
| 0845-0900 | 8 | 445 | 13 | 5 | 10 | 4 | 8 | 656 | 146 | 133 | 6 | 35 |
| 0900-0915 | 10 | 368 | 9 | 9 | 5 | 10 | 16 | 628 | 123 | 108 | 8 | 43 |
| 0915-0930 | 18 | 349 | 16 | 10 | 2 | 1 | 3 | 541 | 102 | 122 | 5 | 38 |
| 0930-0945 | 17 | 386 | 17 | 6 | 7 | 9 | 9 | 516 | 95 | 105 | 3 | 36 |
| 0945-1000 | 17 | 389 | 11 | 5 | 4 | 8 | 10 | 522 | 91 | 94 | 5 | 31 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 48 | 1047 | 22 | 24 | 14 | 9 | 27 | 2508 | 594 | 400 | 15 | 101 | 4809 |
| 0715-0815 | 41 | 1361 | 24 | 32 | 16 | 12 | 29 | 2799 | 631 | 477 | 20 | 128 | 5570 |
| 0730-0830 | 41 | 1531 | 24 | 39 | 15 | 13 | 35 | 3023 | 683 | 512 | 22 | 151 | 6089 |
| 0745-0845 | 50 | 1718 | 38 | 37 | 14 | 11 | 38 | 3081 | 619 | 547 | 21 | 175 | 6349 |
| 0800-0900 | 45 | 1745 | 43 | 34 | 19 | 13 | 38 | 2961 | 584 | 536 | 22 | 173 | 6213 |
| 0815-0915 | 45 | 1633 | 47 | 33 | 20 | 19 | 43 | 2805 | 560 | 512 | 23 | 181 | 5921 |
| 0830-0930 | 52 | 1597 | 57 | 31 | 20 | 17 | 36 | 2574 | 484 | 515 | 23 | 173 | 5579 |
| 0845-0945 | 53 | 1548 | 55 | 30 | 24 | 24 | 36 | 2341 | 466 | 468 | 22 | 152 | 5219 |
| 0900-1000 | 62 | 1492 | 53 | 30 | 18 | 28 | 38 | 2207 | 411 | 429 | 21 | 148 | 4937 |

A.M. PEAK HOUR
0745-0845

FIJI WAY




LINCOLN BOULEVARD


DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

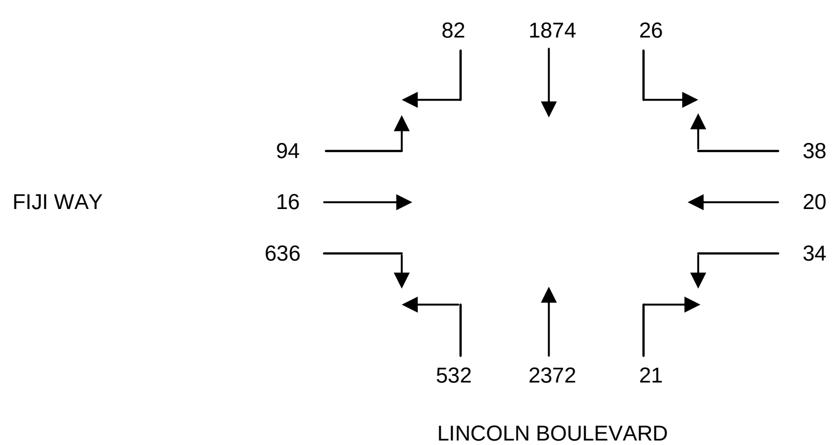
# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: TUESDAY DECEMBER 13, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S LINCOLN BOULEVARD
E/W FIJI WAY
FILE NUMBER: 22-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 17 | 361 | 2 | 7 | 7 | 6 | 4 | 419 | 102 | 144 | 1 | 23 |
| 0415-0430 | 25 | 481 | 8 | 10 | 3 | 3 | 6 | 512 | 99 | 123 | 6 | 24 |
| 0430-0445 | 10 | 447 | 5 | 7 | 4 | 16 | 5 | 531 | 126 | 137 | 9 | 45 |
| 0445-0500 | 30 | 421 | 2 | 8 | 3 | 12 | 6 | 507 | 142 | 155 | 4 | 19 |
| 0500-0515 | 24 | 445 | 8 | 11 | 5 | 13 | 7 | 565 | 99 | 184 | 5 | 23 |
| 0515-0530 | 19 | 429 | 8 | 13 | 6 | 10 | 4 | 558 | 135 | 148 | 4 | 26 |
| 0530-0545 | 20 | 491 | 5 | 5 | 7 | 8 | 4 | 657 | 162 | 149 | 1 | 29 |
| 0545-0600 | 19 | 509 | 5 | 9 | 2 | 3 | 6 | 592 | 136 | 155 | 6 | 16 |
| 0600-0615 | 28 | 448 | 9 | 5 | 6 | 7 | 4 | 548 | 150 | 152 | 4 | 21 |
| 0615-0630 | 23 | 426 | 5 | 8 | 2 | 5 | 5 | 499 | 140 | 138 | 1 | 26 |
| 0630-0645 | 19 | 433 | 4 | 8 | 6 | 7 | 7 | 437 | 130 | 156 | 5 | 25 |
| 0645-0700 | 24 | 438 | 6 | 6 | 5 | 9 | 8 | 431 | 121 | 136 | 3 | 33 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 82 | 1710 | 17 | 32 | 17 | 37 | 21 | 1969 | 469 | 559 | 20 | 111 | 5044 |
| 0415-0515 | 89 | 1794 | 23 | 36 | 15 | 44 | 24 | 2115 | 466 | 599 | 24 | 111 | 5340 |
| 0430-0530 | 83 | 1742 | 23 | 39 | 18 | 51 | 22 | 2161 | 502 | 624 | 22 | 113 | 5400 |
| 0445-0545 | 93 | 1786 | 23 | 37 | 21 | 43 | 21 | 2287 | 538 | 636 | 14 | 97 | 5596 |
| 0500-0600 | 82 | 1874 | 26 | 38 | 20 | 34 | 21 | 2372 | 532 | 636 | 16 | 94 | 5745 |
| 0515-0615 | 86 | 1877 | 27 | 32 | 21 | 28 | 18 | 2355 | 583 | 604 | 15 | 92 | 5738 |
| 0530-0630 | 90 | 1874 | 24 | 27 | 17 | 23 | 19 | 2296 | 588 | 594 | 12 | 92 | 5656 |
| 0545-0645 | 89 | 1816 | 23 | 30 | 16 | 22 | 22 | 2076 | 556 | 601 | 16 | 88 | 5355 |
| 0600-0700 | 94 | 1745 | 24 | 27 | 19 | 28 | 24 | 1915 | 541 | 582 | 13 | 105 | 5117 |

P.M. PEAK HOUR
0500-0600





DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

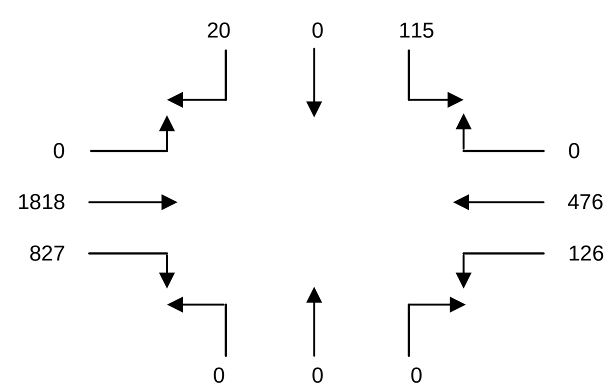
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY DECEMBER 8, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | MARINA FREEWAY (EASTBOUND) ON/OFF-RAMPS |
| | E/W | CULVER BOULEVARD |
| FILE NUMBER: | | 23-AM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 1 | 0 | 4 | 0 | 62 | 17 | 0 | 0 | 0 | 182 | 227 | 0 |
| 0715-0730 | 4 | 0 | 16 | 0 | 66 | 23 | 0 | 0 | 0 | 218 | 319 | 0 |
| 0730-0745 | 2 | 0 | 24 | 0 | 94 | 19 | 0 | 0 | 0 | 212 | 466 | 0 |
| 0745-0800 | 5 | 0 | 35 | 0 | 135 | 29 | 0 | 0 | 0 | 200 | 424 | 0 |
| 0800-0815 | 6 | 0 | 30 | 0 | 126 | 33 | 0 | 0 | 0 | 218 | 475 | 0 |
| 0815-0830 | 7 | 0 | 26 | 0 | 121 | 45 | 0 | 0 | 0 | 197 | 453 | 0 |
| 0830-0845 | 9 | 0 | 22 | 0 | 95 | 41 | 0 | 0 | 0 | 166 | 441 | 0 |
| 0845-0900 | 7 | 0 | 17 | 0 | 98 | 32 | 0 | 0 | 0 | 183 | 368 | 0 |
| 0900-0915 | 4 | 0 | 21 | 0 | 86 | 38 | 0 | 0 | 0 | 203 | 409 | 0 |
| 0915-0930 | 6 | 0 | 26 | 0 | 92 | 42 | 0 | 0 | 0 | 198 | 394 | 0 |
| 0930-0945 | 4 | 0 | 17 | 0 | 102 | 46 | 0 | 0 | 0 | 175 | 372 | 0 |
| 0945-1000 | 2 | 0 | 12 | 0 | 78 | 35 | 0 | 0 | 0 | 158 | 334 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 12 | 0 | 79 | 0 | 357 | 88 | 0 | 0 | 0 | 812 | 1436 | 0 | 2784 |
| 0715-0815 | 17 | 0 | 105 | 0 | 421 | 104 | 0 | 0 | 0 | 848 | 1684 | 0 | 3179 |
| 0730-0830 | 20 | 0 | 115 | 0 | 476 | 126 | 0 | 0 | 0 | 827 | 1818 | 0 | 3382 |
| 0745-0845 | 27 | 0 | 113 | 0 | 477 | 148 | 0 | 0 | 0 | 781 | 1793 | 0 | 3339 |
| 0800-0900 | 29 | 0 | 95 | 0 | 440 | 151 | 0 | 0 | 0 | 764 | 1737 | 0 | 3216 |
| 0815-0915 | 27 | 0 | 86 | 0 | 400 | 156 | 0 | 0 | 0 | 749 | 1671 | 0 | 3089 |
| 0830-0930 | 26 | 0 | 86 | 0 | 371 | 153 | 0 | 0 | 0 | 750 | 1612 | 0 | 2998 |
| 0845-0945 | 21 | 0 | 81 | 0 | 378 | 158 | 0 | 0 | 0 | 759 | 1543 | 0 | 2940 |
| 0900-1000 | 16 | 0 | 76 | 0 | 358 | 161 | 0 | 0 | 0 | 734 | 1509 | 0 | 2854 |

A.M. PEAK HOUR
0730-0830

CULVER BOULEVARD




MARINA FREEWAY (EASTBOUND) ON/OFF-RAMPS

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

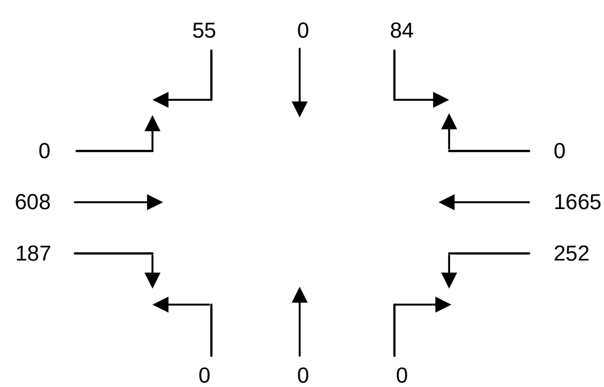
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY DECEMBER 8, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | MARINA FREEWAY (EASTBOUND) ON/OFF-RAMPS |
| | E/W | CULVER BOULEVARD |
| FILE NUMBER: | | 23-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 8 | 0 | 14 | 0 | 204 | 70 | 0 | 0 | 0 | 52 | 129 | 0 |
| 0415-0430 | 18 | 0 | 19 | 0 | 246 | 43 | 0 | 0 | 0 | 54 | 134 | 0 |
| 0430-0445 | 12 | 0 | 21 | 0 | 308 | 60 | 0 | 0 | 0 | 49 | 141 | 0 |
| 0445-0500 | 20 | 0 | 17 | 0 | 267 | 67 | 0 | 0 | 0 | 39 | 170 | 0 |
| 0500-0515 | 18 | 0 | 18 | 0 | 370 | 69 | 0 | 0 | 0 | 43 | 177 | 0 |
| 0515-0530 | 14 | 0 | 22 | 0 | 359 | 74 | 0 | 0 | 0 | 50 | 165 | 0 |
| 0530-0545 | 8 | 0 | 21 | 0 | 404 | 54 | 0 | 0 | 0 | 46 | 158 | 0 |
| 0545-0600 | 19 | 0 | 20 | 0 | 381 | 49 | 0 | 0 | 0 | 50 | 149 | 0 |
| 0600-0615 | 14 | 0 | 19 | 0 | 462 | 86 | 0 | 0 | 0 | 43 | 147 | 0 |
| 0615-0630 | 14 | 0 | 24 | 0 | 418 | 63 | 0 | 0 | 0 | 48 | 154 | 0 |
| 0630-0645 | 18 | 0 | 19 | 0 | 392 | 60 | 0 | 0 | 0 | 44 | 148 | 0 |
| 0645-0700 | 15 | 0 | 10 | 0 | 364 | 39 | 0 | 0 | 0 | 45 | 156 | 0 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 58 | 0 | 71 | 0 | 1025 | 240 | 0 | 0 | 0 | 194 | 574 | 0 | 2162 |
| 0415-0515 | 68 | 0 | 75 | 0 | 1191 | 239 | 0 | 0 | 0 | 185 | 622 | 0 | 2380 |
| 0430-0530 | 64 | 0 | 78 | 0 | 1304 | 270 | 0 | 0 | 0 | 181 | 653 | 0 | 2550 |
| 0445-0545 | 60 | 0 | 78 | 0 | 1400 | 264 | 0 | 0 | 0 | 178 | 670 | 0 | 2650 |
| 0500-0600 | 59 | 0 | 81 | 0 | 1514 | 246 | 0 | 0 | 0 | 189 | 649 | 0 | 2738 |
| 0515-0615 | 55 | 0 | 82 | 0 | 1606 | 263 | 0 | 0 | 0 | 189 | 619 | 0 | 2814 |
| 0530-0630 | 55 | 0 | 84 | 0 | 1665 | 252 | 0 | 0 | 0 | 187 | 608 | 0 | 2851 |
| 0545-0645 | 65 | 0 | 82 | 0 | 1653 | 258 | 0 | 0 | 0 | 185 | 598 | 0 | 2841 |
| 0600-0700 | 61 | 0 | 72 | 0 | 1636 | 248 | 0 | 0 | 0 | 180 | 605 | 0 | 2802 |

P.M. PEAK HOUR
0530-0630

CULVER BOULEVARD




MARINA FREEWAY (EASTBOUND) ON/OFF-RAMPS

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

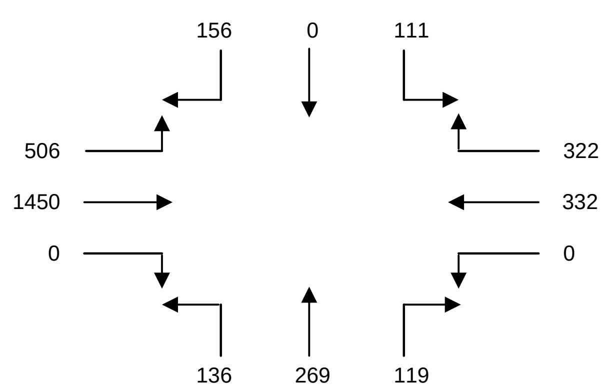
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | TUESDAY DECEMBER 13, 2011 |
| PERIOD: | | 07:00 AM TO 10:00 AM |
| INTERSECTION | N/S | MARINA FREEWAY (WESTBOUND) OFF-RAMP |
| | E/W | CULVER BOULEVARD |
| FILE NUMBER: | | 24-AM |

| 15 MINUTE TOTALS | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0700-0715 | 22 | 0 | 9 | 19 | 36 | 0 | 8 | 31 | 25 | 0 | 181 | 48 |
| 0715-0730 | 25 | 0 | 5 | 30 | 44 | 0 | 15 | 45 | 28 | 0 | 277 | 57 |
| 0730-0745 | 30 | 0 | 20 | 68 | 51 | 0 | 24 | 71 | 35 | 0 | 369 | 127 |
| 0745-0800 | 54 | 0 | 38 | 79 | 76 | 0 | 36 | 72 | 39 | 0 | 323 | 141 |
| 0800-0815 | 40 | 0 | 38 | 92 | 97 | 0 | 36 | 70 | 29 | 0 | 393 | 117 |
| 0815-0830 | 32 | 0 | 15 | 83 | 108 | 0 | 23 | 56 | 33 | 0 | 365 | 121 |
| 0830-0845 | 40 | 0 | 18 | 76 | 59 | 0 | 19 | 52 | 32 | 0 | 338 | 133 |
| 0845-0900 | 32 | 0 | 16 | 65 | 61 | 0 | 17 | 43 | 40 | 0 | 294 | 95 |
| 0900-0915 | 29 | 0 | 12 | 51 | 74 | 0 | 28 | 53 | 25 | 0 | 309 | 128 |
| 0915-0930 | 21 | 0 | 18 | 55 | 71 | 0 | 20 | 37 | 35 | 0 | 318 | 95 |
| 0930-0945 | 28 | 0 | 15 | 35 | 80 | 0 | 31 | 35 | 34 | 0 | 296 | 86 |
| 0945-1000 | 24 | 0 | 16 | 46 | 63 | 0 | 22 | 37 | 23 | 0 | 283 | 57 |

| 1 HOUR TOTALS | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0700-0800 | 131 | 0 | 72 | 196 | 207 | 0 | 83 | 219 | 127 | 0 | 1150 | 373 | 2558 |
| 0715-0815 | 149 | 0 | 101 | 269 | 268 | 0 | 111 | 258 | 131 | 0 | 1362 | 442 | 3091 |
| 0730-0830 | 156 | 0 | 111 | 322 | 332 | 0 | 119 | 269 | 136 | 0 | 1450 | 506 | 3401 |
| 0745-0845 | 166 | 0 | 109 | 330 | 340 | 0 | 114 | 250 | 133 | 0 | 1419 | 512 | 3373 |
| 0800-0900 | 144 | 0 | 87 | 316 | 325 | 0 | 95 | 221 | 134 | 0 | 1390 | 466 | 3178 |
| 0815-0915 | 133 | 0 | 61 | 275 | 302 | 0 | 87 | 204 | 130 | 0 | 1306 | 477 | 2975 |
| 0830-0930 | 122 | 0 | 64 | 247 | 265 | 0 | 84 | 185 | 132 | 0 | 1259 | 451 | 2809 |
| 0845-0945 | 110 | 0 | 61 | 206 | 286 | 0 | 96 | 168 | 134 | 0 | 1217 | 404 | 2682 |
| 0900-1000 | 102 | 0 | 61 | 187 | 288 | 0 | 101 | 162 | 117 | 0 | 1206 | 366 | 2590 |

A.M. PEAK HOUR
0730-0830

CULVER BOULEVARD




MARINA FREEWAY (WESTBOUND) OFF-RAMP

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

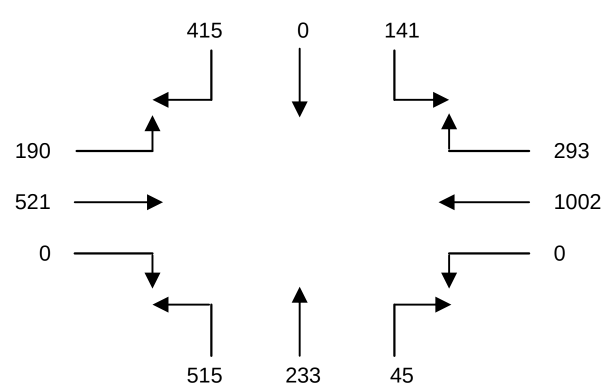
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: TUESDAY DECEMBER 13, 2011
PERIOD: 04:00 PM TO 07:00 PM
INTERSECTION N/S MARINA FREEWAY (WESTBOUND) OFF-RAMP
E/W CULVER BOULEVARD
FILE NUMBER: 24-PM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 87 | 0 | 30 | 44 | 127 | 0 | 12 | 39 | 62 | 0 | 102 | 44 |
| 0415-0430 | 68 | 0 | 28 | 36 | 155 | 0 | 16 | 44 | 74 | 0 | 107 | 38 |
| 0430-0445 | 89 | 0 | 26 | 57 | 199 | 0 | 11 | 56 | 85 | 0 | 119 | 48 |
| 0445-0500 | 95 | 0 | 31 | 54 | 174 | 0 | 12 | 43 | 70 | 0 | 130 | 63 |
| 0500-0515 | 104 | 0 | 35 | 49 | 206 | 0 | 10 | 71 | 134 | 0 | 151 | 49 |
| 0515-0530 | 128 | 0 | 28 | 58 | 213 | 0 | 15 | 47 | 100 | 0 | 142 | 51 |
| 0530-0545 | 107 | 0 | 32 | 91 | 247 | 0 | 11 | 52 | 111 | 0 | 129 | 56 |
| 0545-0600 | 91 | 0 | 30 | 61 | 238 | 0 | 12 | 41 | 110 | 0 | 134 | 40 |
| 0600-0615 | 105 | 0 | 40 | 86 | 271 | 0 | 13 | 79 | 168 | 0 | 120 | 48 |
| 0615-0630 | 112 | 0 | 39 | 55 | 246 | 0 | 9 | 61 | 126 | 0 | 138 | 46 |
| 0630-0645 | 77 | 0 | 38 | 49 | 276 | 0 | 11 | 55 | 107 | 0 | 121 | 50 |
| 0645-0700 | 69 | 0 | 16 | 47 | 219 | 0 | 8 | 43 | 120 | 0 | 124 | 48 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 339 | 0 | 115 | 191 | 655 | 0 | 51 | 182 | 291 | 0 | 458 | 193 | 2475 |
| 0415-0515 | 356 | 0 | 120 | 196 | 734 | 0 | 49 | 214 | 363 | 0 | 507 | 198 | 2737 |
| 0430-0530 | 416 | 0 | 120 | 218 | 792 | 0 | 48 | 217 | 389 | 0 | 542 | 211 | 2953 |
| 0445-0545 | 434 | 0 | 126 | 252 | 840 | 0 | 48 | 213 | 415 | 0 | 552 | 219 | 3099 |
| 0500-0600 | 430 | 0 | 125 | 259 | 904 | 0 | 48 | 211 | 455 | 0 | 556 | 196 | 3184 |
| 0515-0615 | 431 | 0 | 130 | 296 | 969 | 0 | 51 | 219 | 489 | 0 | 525 | 195 | 3305 |
| 0530-0630 | 415 | 0 | 141 | 293 | 1002 | 0 | 45 | 233 | 515 | 0 | 521 | 190 | 3355 |
| 0545-0645 | 385 | 0 | 147 | 251 | 1031 | 0 | 45 | 236 | 511 | 0 | 513 | 184 | 3303 |
| 0600-0700 | 363 | 0 | 133 | 237 | 1012 | 0 | 41 | 238 | 521 | 0 | 503 | 192 | 3240 |

P.M. PEAK HOUR
0530-0630

CULVER BOULEVARD




MARINA FREEWAY (WESTBOUND) OFF-RAMP

DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

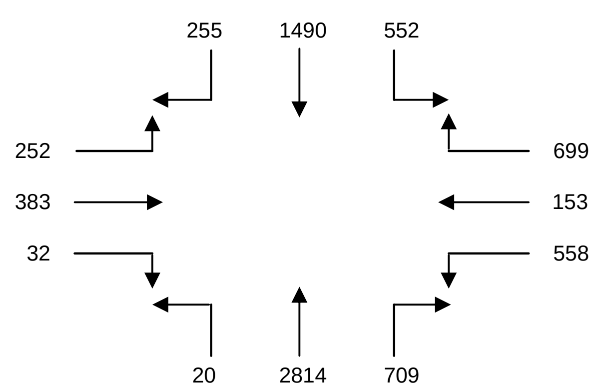
CLIENT: HIRSCH/GREEN TRANSPORTATION CONSULTING, INC.
PROJECT: PARCEL 44 - MARINA DEL REY
DATE: THURSDAY DECEMBER 8, 2011
PERIOD: 07:00 AM TO 10:00 AM
INTERSECTION N/S LINCOLN BOULEVARD
E/W JEFFERSON BOULEVARD
FILE NUMBER: 25-AM

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0700-0715 | 26 | 151 | 53 | 96 | 10 | 56 | 101 | 506 | 0 | 3 | 31 | 18 |
| 0715-0730 | 44 | 215 | 48 | 118 | 19 | 61 | 116 | 527 | 1 | 3 | 44 | 39 |
| 0730-0745 | 52 | 257 | 67 | 120 | 19 | 83 | 121 | 704 | 2 | 11 | 56 | 56 |
| 0745-0800 | 71 | 395 | 105 | 150 | 36 | 150 | 159 | 755 | 4 | 6 | 112 | 68 |
| 0800-0815 | 70 | 395 | 156 | 234 | 43 | 166 | 172 | 642 | 7 | 11 | 96 | 73 |
| 0815-0830 | 51 | 339 | 120 | 160 | 28 | 108 | 202 | 750 | 3 | 5 | 74 | 58 |
| 0830-0845 | 63 | 361 | 171 | 155 | 46 | 134 | 176 | 667 | 6 | 10 | 101 | 53 |
| 0845-0900 | 62 | 376 | 152 | 171 | 29 | 97 | 136 | 598 | 2 | 21 | 102 | 46 |
| 0900-0915 | 41 | 309 | 143 | 156 | 27 | 90 | 151 | 574 | 5 | 6 | 84 | 40 |
| 0915-0930 | 50 | 267 | 161 | 171 | 35 | 78 | 120 | 459 | 6 | 7 | 94 | 18 |
| 0930-0945 | 40 | 299 | 165 | 123 | 34 | 91 | 94 | 463 | 2 | 20 | 79 | 43 |
| 0945-1000 | 52 | 296 | 148 | 121 | 17 | 95 | 67 | 486 | 4 | 17 | 50 | 22 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0700-0800 | 193 | 1018 | 273 | 484 | 84 | 350 | 497 | 2492 | 7 | 23 | 243 | 181 | 5845 |
| 0715-0815 | 237 | 1262 | 376 | 622 | 117 | 460 | 568 | 2628 | 14 | 31 | 308 | 236 | 6859 |
| 0730-0830 | 244 | 1386 | 448 | 664 | 126 | 507 | 654 | 2851 | 16 | 33 | 338 | 255 | 7522 |
| 0745-0845 | 255 | 1490 | 552 | 699 | 153 | 558 | 709 | 2814 | 20 | 32 | 383 | 252 | 7917 |
| 0800-0900 | 246 | 1471 | 599 | 720 | 146 | 505 | 686 | 2657 | 18 | 47 | 373 | 230 | 7698 |
| 0815-0915 | 217 | 1385 | 586 | 642 | 130 | 429 | 665 | 2589 | 16 | 42 | 361 | 197 | 7259 |
| 0830-0930 | 216 | 1313 | 627 | 653 | 137 | 399 | 583 | 2298 | 19 | 44 | 381 | 157 | 6827 |
| 0845-0945 | 193 | 1251 | 621 | 621 | 125 | 356 | 501 | 2094 | 15 | 54 | 359 | 147 | 6337 |
| 0900-1000 | 183 | 1171 | 617 | 571 | 113 | 354 | 432 | 1982 | 17 | 50 | 307 | 123 | 5920 |

A.M. PEAK HOUR
0745-0845

JEFFERSON BOULEVARD




LINCOLN BOULEVARD


DATA PROVIDED BY:

QUALITY TRAFFIC DATA, LLC
9701 W. PICO BOULEVARD, SUITE 205
LOS ANGELES, CALIFORNIA 90035
PH: 310-341-0019
FAX: 310-807-9247
INFO@QUALITYTRAFFICDATA.COM

# INTERSECTION TURNING MOVEMENT COUNT SUMMARY

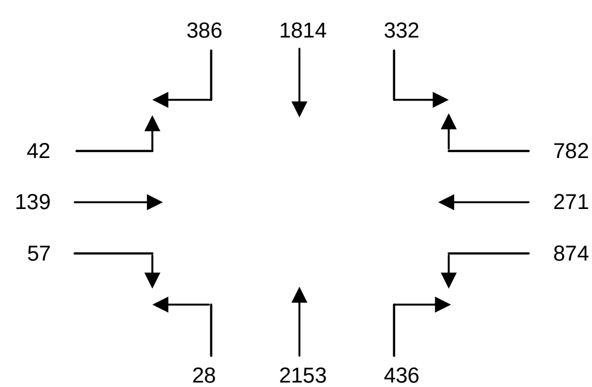
| | | |
|---|---|---|
| CLIENT: | | HIRSCH/GREEN TRANSPORTATION CONSULTING, INC. |
| PROJECT: | | PARCEL 44 - MARINA DEL REY |
| DATE: | | THURSDAY DECEMBER 8, 2011 |
| PERIOD: | | 04:00 PM TO 07:00 PM |
| INTERSECTION | N/S | LINCOLN BOULEVARD |
| | E/W | JEFFERSON BOULEVARD |
| FILE NUMBER: | | 25-PM |

| 15 MINUTE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT |
| 0400-0415 | 65 | 364 | 76 | 122 | 45 | 156 | 70 | 404 | 2 | 14 | 36 | 5 |
| 0415-0430 | 95 | 423 | 96 | 99 | 56 | 131 | 80 | 517 | 8 | 17 | 31 | 9 |
| 0430-0445 | 103 | 401 | 99 | 153 | 59 | 180 | 85 | 501 | 6 | 19 | 24 | 14 |
| 0445-0500 | 101 | 402 | 91 | 162 | 53 | 119 | 92 | 482 | 5 | 14 | 37 | 13 |
| 0500-0515 | 110 | 447 | 93 | 129 | 67 | 217 | 77 | 539 | 6 | 16 | 43 | 8 |
| 0515-0530 | 74 | 434 | 85 | 192 | 46 | 191 | 114 | 507 | 9 | 16 | 36 | 4 |
| 0530-0545 | 88 | 486 | 82 | 230 | 66 | 239 | 135 | 582 | 8 | 14 | 37 | 16 |
| 0545-0600 | 123 | 452 | 97 | 173 | 74 | 213 | 104 | 553 | 4 | 14 | 33 | 15 |
| 0600-0615 | 101 | 442 | 68 | 187 | 85 | 231 | 83 | 511 | 7 | 13 | 33 | 7 |
| 0615-0630 | 85 | 399 | 93 | 205 | 54 | 190 | 73 | 435 | 8 | 10 | 28 | 7 |
| 0630-0645 | 90 | 418 | 84 | 133 | 79 | 196 | 98 | 443 | 4 | 18 | 29 | 6 |
| 0645-0700 | 98 | 403 | 85 | 146 | 66 | 215 | 61 | 408 | 5 | 17 | 32 | 14 |

| 1 HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTALS |
| 0400-0500 | 364 | 1590 | 362 | 536 | 213 | 586 | 327 | 1904 | 21 | 64 | 128 | 41 | 6136 |
| 0415-0515 | 409 | 1673 | 379 | 543 | 235 | 647 | 334 | 2039 | 25 | 66 | 135 | 44 | 6529 |
| 0430-0530 | 388 | 1684 | 368 | 636 | 225 | 707 | 368 | 2029 | 26 | 65 | 140 | 39 | 6675 |
| 0445-0545 | 373 | 1769 | 351 | 713 | 232 | 766 | 418 | 2110 | 28 | 60 | 153 | 41 | 7014 |
| 0500-0600 | 395 | 1819 | 357 | 724 | 253 | 860 | 430 | 2181 | 27 | 60 | 149 | 43 | 7298 |
| 0515-0615 | 386 | 1814 | 332 | 782 | 271 | 874 | 436 | 2153 | 28 | 57 | 139 | 42 | 7314 |
| 0530-0630 | 397 | 1779 | 340 | 795 | 279 | 873 | 395 | 2081 | 27 | 51 | 131 | 45 | 7193 |
| 0545-0645 | 399 | 1711 | 342 | 698 | 292 | 830 | 358 | 1942 | 23 | 55 | 123 | 35 | 6808 |
| 0600-0700 | 374 | 1662 | 330 | 671 | 284 | 832 | 315 | 1797 | 24 | 58 | 122 | 34 | 6503 |

P.M. PEAK HOUR
0515-0615

JEFFERSON BOULEVARD




LINCOLN BOULEVARD

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# TRAFFIC IMPACT ANALYSIS REPORT - APPENDIX VOLUME II (G)

## Proposed Commercial Redevelopment of Parcel 44 on Admiralty Way between Bali Way and Mindanao Way in Marina del Rey, California

**Prepared for:**

**Pacific Ocean Management, LLC**
**13575 Mindanao Way**
**Marina del Rey, California 90292**

**Prepared by:**

HIRSCH GREEN
Hirsch/Green Transportation Consulting, Inc.
13333 Ventura Boulevard, #204
Sherman Oaks, California 91423

REGISTERED PROFESSIONAL ENGINEER
RONALD R. HIRSCH
NO. 2318
6-30-2015
TRAFFIC
STATE OF CALIFORNIA

**OCTOBER 2013**

# APPENDIX G

# CRITICAL MOVEMENT ANALYSIS (“CMA”) CALCULATION WORKSHEETS

**Existing (2013)**

**AM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 172 | | 95 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,623 | | 876 | 876 |
| | Through/Right | 1 | | | 876 | |
| | Right | 0 | 130 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 2 | 179 | | 98 | 98 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,208 | | 628 | |
| | Through/Right | 1 | | | 628 | |
| | Right | 0 | 47 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **974** |
| Eastbound | Left | 2 | 139 | | 76 | 76 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 841 | | 280 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 124 | 95 | 29 | |
| | Total Lanes | 6 | | | | |
| Westbound | Left | 2 | 368 | | 202 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 995 | | 498 | 498 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 227 | 98 | 129 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **574** |
| | | | **Total Intersection Critical Volumes** | | | **1,548** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.126** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.026** |
| | | | **Level of Service (LOS)** | | | **F** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 2 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Pacific Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 135 | |
| | Through | 0 | 133 | | | |
| | Through/Right | 1 | | | 192 | 192 |
| | Right | 0 | 192 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 0 | 369 | | | |
| | Left/Through | 1 | | | 369 | 369 |
| | Through | 0 | 68 | | | |
| | Through/Right | 1 | | | 85 | |
| | Right | 0 | 17 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **561** |
| Eastbound | Left | 0 | 19 | | | 19 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 60 | | 92 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| Westbound | Left | 1 | 107 | | 107 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 64 | | 64 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 692 | 369 | 323 | 323 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **342** |
| | | | **Total Intersection Critical Volumes** | | | **903** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.634** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.534** |
| | | | **Level of Service (LOS)** | | | **A** |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 135 | | 135 | 135 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 38 | | 38 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 195 | 46 | 149 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 0 | 3 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 5 | | 21 | 21 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **156** |
| Eastbound | Left | 1 | 12 | | 12 | 12 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 583 | | 292 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 43 | 43 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 70 | | 70 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 744 | | 372 | 372 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 48 | 4 | 44 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **384** |
| | | | **Total Intersection Critical Volumes** | | | **540** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.360** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.260** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 438 | | 241 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 337 | | 337 | 337 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 385 | 59 | 326 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 17 | | 17 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 125 | | | |
| | Through/Right | 1 | | | 193 | 193 |
| | Right | 0 | 68 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **530** |
| Eastbound | Left | 1 | 43 | | 43 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 597 | | 298 | 298 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 183 | 168 | 15 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 118 | | 118 | 118 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 395 | | 198 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 42 | 42 | 0 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **416** |
| **Total Intersection Critical Volumes** | **946** |
| **Intersection Capacity** | **1,425** |
| **Base CMA** | **0.664** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.564** |
| **Level of Service (LOS)** | **A** |

**Number of Clearance Intervals** **3**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 240 | 0 | 240 | 240 |
| | Total Lanes | 1 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **240** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 923 | | 462 | 462 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 81 | 81 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 156 | | 156 | 156 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 578 | | 289 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **618** |
| | | **Total Intersection Critical Volumes** | **858** |
| **Number of Clearance Intervals** | **0** | **Intersection Capacity** | **1,200** |
| | | **Base CMA** | **0.715** |
| **Signal Coordination** | **None** | **Signal Coordination Adjustment** | **0.000** |
| | | **Final CMA** | **0.715** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 414 | | 268 | 268 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 268 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 123 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **268** |
| Eastbound | Left | 1 | 165 | | 165 | 165 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,049 | | 524 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 599 | | 300 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 827 | 268 | 559 | 559 |
| | Total Lanes | 3 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **724** |
| | | **Total Intersection Critical Volumes** | **992** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.661** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.561** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 510 | | 280 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,775 | | 656 | 656 |
| | Through/Right | 1 | | | 656 | |
| | Right | 0 | 192 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 2 | 306 | | 168 | 168 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,230 | | 455 | |
| | Through/Right | 1 | | | 455 | |
| | Right | 0 | 134 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **824** |
| Eastbound | Left | 2 | 129 | | 71 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 729 | | 364 | 364 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 563 | 280 | 283 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 2 | 136 | | 75 | 75 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 651 | | 326 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 211 | 168 | 43 | |
| | Total Lanes | 5 | | | | |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **439** |
| **Total Intersection Critical Volumes** | **1,263** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.919** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.819** |
| **Level of Service (LOS)** | **D** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 8 **Date** October 7, 2013
**Intersection Name** North/South: Glencoe Avenue/Costco Plaza Driveway
East/West: Washington Boulevard
**Intersection Control** Signalized
**Analysis Period** AM Peak Hour
**Analysis Scenario** Existing (2013)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 255 | | 159 | 159 |
| | Left/Through | 1 | | | 159 | |
| Northbound | Through | 0 | 63 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 342 | 277 | 65 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 101 | | 71 | 71 |
| | Left/Through | 1 | | | 71 | |
| Southbound | Through | 0 | 41 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 23 | 22 | 1 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **230** |
| | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 1,001 | | 500 | 500 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 132 | 132 | 0 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 277 | | 277 | 277 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 692 | | 285 | |
| | Through/Right | 1 | | | 285 | |
| | Right | 0 | 164 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **777** |
| **Total Intersection Critical Volumes** | **1,007** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.732** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.632** |
| **Level of Service (LOS)** | **B** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 561 | | 280 | 280 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 747 | 747 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 257 | | 257 | 257 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 170 | | 57 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **537** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 339 | | 186 | 186 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 635 | 514 | 60 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **186** |
| | | | **Total Intersection Critical Volumes** | | | **723** |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.507** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.407** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 28 | | 28 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 67 | | | |
| | Through/Right | 1 | | | 121 | 121 |
| | Right | 0 | 54 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 140 | | 140 | 140 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 94 | 45 | 49 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **261** |
| Eastbound | Left | 1 | 90 | | 90 | 90 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 870 | | 439 | |
| | Through/Right | 1 | | | 439 | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 45 | | 45 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 877 | | 490 | 490 |
| | Through/Right | 1 | | | 490 | |
| | Right | 0 | 103 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **580** |
| | | | **Total Intersection Critical Volumes** | | | **841** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.561** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.461** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 11 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Maxella Avenue/Marina Pointe Drive | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 56 | | 31 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,290 | | 763 | 763 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 215 | 106 | 109 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 120 | | 66 | 66 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,834 | | 472 | |
| | Through/Right | 1 | | | 472 | |
| | Right | 0 | 56 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **829** |
| | Left | 1 | 63 | | 63 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 79 | | 79 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 129 | 31 | 98 | 98 |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 183 | | 106 | 106 |
| | Left/Through | 1 | | | 106 | |
| Westbound | Through | 0 | 29 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 111 | 66 | 45 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **204** |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,033** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.751** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.651** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 79 | | 79 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 454 | | 454 | 454 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 60 | 58 | 2 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 22 | | 22 | 22 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 363 | | 220 | |
| | Through/Right | 1 | | | 220 | |
| | Right | 0 | 77 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **476** |
| Eastbound | Left | 1 | 114 | | 114 | 114 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 76 | | 76 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 116 | 116 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 82 | | 82 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 86 | | 78 | 78 |
| | Through/Right | 1 | | | 78 | |
| | Right | 0 | 71 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **192** |
| | | **Total Intersection Critical Volumes** | **668** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.445** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.345** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 13 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 1,594 | | 628 | 628 |
| | Through/Right | 1 | | | 628 | |
| | Right | 0 | 289 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 868 | | 477 | 477 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,315 | | 438 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,105** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 148 | | 81 | 81 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 913 | 913 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **81** |
| | | | **Total Intersection Critical Volumes** | | | **1,186** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.832** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.732** |
| | | | **Level of Service (LOS)** | | | **C** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 12 | | 12 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,036 | | 596 | 596 |
| | Through/Right | 1 | | | 596 | |
| | Right | 0 | 157 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 319 | | 319 | 319 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,266 | | 636 | |
| | Through/Right | 1 | | | 636 | |
| | Right | 0 | 6 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **915** |
| Eastbound | Left | 0 | 13 | | | 13 |
| | Left/Through | 1 | | | 14 | |
| | Through | 0 | 8 | | | |
| | Through/Right | 1 | | | 14 | |
| | Right | 0 | 7 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 29 | | | |
| | Through/Right | 1 | | | 29 | 29 |
| | Right | 1 | 298 | 298 | 0 | |
| | Total Lanes | 3 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **42** |
| | | **Total Intersection Critical Volumes** | **957** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.696** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.596** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 111 | | 111 | 111 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,534 | | 518 | |
| | Through/Right | 1 | | | 518 | |
| | Right | 0 | 20 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 3 | | 3 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,247 | | 484 | 484 |
| | Through/Right | 1 | | | 484 | |
| | Right | 0 | 205 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **595** |
| Eastbound | Left | 1 | 319 | | 160 | 160 |
| | Left/Through | 1 | | | 160 | |
| | Through | 0 | 2 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 140 | 56 | 84 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 2 | | 10 | 10 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **170** |
| | | **Total Intersection Critical Volumes** | **765** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.556** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.456** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 24 | | 24 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 864 | | 494 | 494 |
| | Through/Right | 1 | | | 494 | |
| | Right | 0 | 124 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 235 | | 235 | 235 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 981 | | 499 | |
| | Through/Right | 1 | | | 499 | |
| | Right | 0 | 17 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **729** |
| Eastbound | Left | 1 | 26 | | 26 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 18 | | | |
| | Through/Right | 1 | | | 50 | 50 |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 118 | | 70 | |
| | Left/Through | 1 | | | 70 | |
| | Through | 0 | 21 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 371 | 235 | 136 | 136 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **186** |
| | | | **Total Intersection Critical Volumes** | | | **915** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.665** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.565** |
| | | | **Level of Service (LOS)** | | | **A** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 197 | | 197 | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,630 | | 877 | 877 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 478 | 156 | 322 | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 182 | | 182 | 182 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,485 | | 507 | |
| | Through/Right | 1 | | | 507 | |
| | Right | 0 | 35 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,059** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 153 | | 87 | 87 |
| | Through/Right | 1 | | | 87 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 2 | 284 | | 156 | 156 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 382 | | 232 | |
| | Through/Right | 1 | | | 232 | |
| | Right | 0 | 82 | 0 | | |
| | Total Lanes | 4 | | | | |

*NB Rt. Turn Overlap with WB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **243** |
| **Total Intersection Critical Volumes** | **1,302** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.947** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.847** |
| **Level of Service (LOS)** | **D** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,111 | | 563 | 563 |
| | Through/Right | 1 | | | 563 | |
| | Right | 0 | 15 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **563** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 386 | | 281 | 281 |
| | Through/Right | 1 | | | 281 | |
| | Right | 1 | 458 | 0 | 281 | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 347 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 807 | | 404 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **472** |
| | | **Total Intersection Critical Volumes** | **1,035** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.726** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.626** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 327 | | 327 | |
| | Left/Through | 1 | | | 480 | |
| | Through | 1 | 961 | | 480 | 480 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 381 | 38 | 343 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **480** |
| Eastbound | Left | 1 | 4 | | 4 | 4 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 403 | | 202 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 802 | | 273 | 273 |
| | Through/Right | 1 | | | 273 | |
| | Right | 0 | 16 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **277** |
| | | **Total Intersection Critical Volumes** | **757** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.531** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.431** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 20 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Glencoe Avenue | | |
| | East/West: | Mindanao Way | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | AM Peak Hour | | | |
| **Analysis Scenario** | Existing (2013) | | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 42 | | 42 | 42 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 168 | | 93 | |
| | Through/Right | 1 | | | 93 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 51 | | 51 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 135 | | 135 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 359 | 187 | 172 | 172 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **214** |
| Eastbound | Left | 1 | 374 | | 374 | 374 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 314 | | 198 | |
| | Through/Right | 1 | | | 198 | |
| | Right | 0 | 81 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 14 | | 14 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 392 | | 230 | 230 |
| | Through/Right | 1 | | | 230 | |
| | Right | 0 | 68 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **604** |
| | | | **Total Intersection Critical Volumes** | | | **818** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.545** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.445** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 618 | | 340 | 340 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 47 | 43 | 4 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **340** |
| Eastbound | Left | 1 | 43 | | 43 | 43 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 91 | | 46 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 113 | | 113 | 113 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 653 | 653 | 0 | |
| | Total Lanes | 2 | | | | |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **156** |
| | | **Total Intersection Critical Volumes** | **496** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.331** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.231** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 623 | | 343 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 3,099 | | 1,046 | 1,046 |
| | Through/Right | 1 | | | 1,046 | |
| | Right | 0 | 38 | 0 | | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 38 | | 38 | 38 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,728 | | 593 | |
| | Through/Right | 1 | | | 593 | |
| | Right | 0 | 50 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,084** |
| | Left | 1 | 176 | | 176 | 176 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 550 | 550 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 11 | | | |
| | Left/Through | 1 | | | 11 | 11 |
| Westbound | Through | 0 | 2 | | | |
| | Through/Right | 1 | | | 2 | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **187** |
| | | | **Total Intersection Critical Volumes** | | | **1,271** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.924** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.824** |
| | | | **Level of Service (LOS)** | | | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) EB On/Off-Ramps | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 20 | | 20 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 116 | 116 |
| | Right | 0 | 116 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **116** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,829 | | 610 | 610 |
| | Through/Right | 0 | | | | |
| | Right | 2 | 832 | 0 | 416 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 127 | | 127 | 127 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 479 | | 240 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **737** |
| | | | **Total Intersection Critical Volumes** | | | **853** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.569** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.469** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp<br>East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 137 | | 137 | |
| | Left/Through | 1 | | | 196 | |
| Northbound | Through | 0 | 271 | | | |
| | Through/Right | 1 | | | 196 | 196 |
| | Right | 0 | 120 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 112 | | 112 | 112 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 157 | 157 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **308** |
| | Left | 1 | 509 | | 509 | 509 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 1,459 | | 730 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 334 | | 167 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 324 | 56 | 268 | 268 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **777** |
| | | | **Total Intersection Critical Volumes** | | | **1,085** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.761** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.661** |
| | | | **Level of Service (LOS)** | | | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 20 | | 20 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 4 | 2,831 | | 708 | 708 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 713 | 77 | 636 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 555 | | 305 | 305 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,499 | | 439 | |
| | Through/Right | 1 | | | 439 | |
| | Right | 0 | 257 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,013** |
| | Left | 1 | 254 | | 254 | 254 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 385 | | 139 | |
| | Through/Right | 1 | | | 139 | |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 561 | | 309 | 309 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 154 | | 77 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 703 | 610 | 46 | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **563** |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,576** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.146** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.046** |
| | | **Level of Service (LOS)** | **F** |

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 147 | | 81 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,464 | | 812 | 812 |
| | Through/Right | 1 | | | 812 | |
| | Right | 0 | 160 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 2 | 168 | | 92 | 92 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 947 | | 492 | |
| | Through/Right | 1 | | | 492 | |
| | Right | 0 | 37 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **904** |
| Eastbound | Left | 2 | 114 | | 63 | 63 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 872 | | 291 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 143 | 81 | 62 | |
| | Total Lanes | 6 | | | | |
| Westbound | Left | 2 | 227 | | 125 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 935 | | 468 | 468 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 138 | 92 | 46 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **531** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,435** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.044** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.944** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 2 **Date** October 7, 2013
**Intersection Name** North/South: Pacific Avenue
East/West: Washington Boulevard
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 71 | |
| Northbound | Through | 0 | 69 | | | |
| | Through/Right | 1 | | | 128 | 128 |
| | Right | 0 | 128 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 0 | 675 | | | |
| | Left/Through | 1 | | | 675 | 675 |
| Southbound | Through | 0 | 118 | | | |
| | Through/Right | 1 | | | 144 | |
| | Right | 0 | 26 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **803** |
| | Left | 0 | 20 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Left/Through/Right | 1 | 91 | | 129 | 129 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 1 | | | | |
| | Left | 1 | 176 | | 176 | 176 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 60 | | 60 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 425 | 425 | 0 | |
| | Total Lanes | 3 | | | | |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **305** |
| **Total Intersection Critical Volumes** | **1,108** |
| **Intersection Capacity** | **1,425** |
| **Base CMA** | **0.778** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.678** |
| **Level of Service (LOS)** | **B** |

**Number of Clearance Intervals** **3**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 50 | | 50 | 50 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 11 | | 11 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 95 | 71 | 24 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 0 | 16 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 28 | | 58 | 58 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 14 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **108** |
| Eastbound | Left | 1 | 13 | | 13 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 742 | | 371 | 371 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 110 | 25 | 85 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 142 | | 142 | 142 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 650 | | 325 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 46 | 42 | 4 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **513** |
| | | | **Total Intersection Critical Volumes** | | | **621** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.414** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.314** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 322 | | 177 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 237 | | 237 | 237 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 237 | 85 | 152 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 31 | | 31 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 443 | | | |
| | Through/Right | 1 | | | 552 | 552 |
| | Right | 0 | 109 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **789** |
| Eastbound | Left | 1 | 37 | | 37 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 588 | | 294 | 294 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 339 | 118 | 221 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 170 | | 170 | 170 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 525 | | 262 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 47 | 47 | 0 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **464** |
| **Total Intersection Critical Volumes** | **1,253** |
| **Intersection Capacity** | **1,425** |
| **Base CMA** | **0.879** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.779** |
| **Level of Service (LOS)** | **C** |

**Number of Clearance Intervals** **3**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 155 | 0 | 155 | 155 |
| | Total Lanes | 1 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **155** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 727 | | 364 | 364 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 185 | 78 | 107 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 434 | | 434 | 434 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 762 | | 381 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **798** |
| | | | **Total Intersection Critical Volumes** | | | **953** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **0** | **Intersection Capacity** | **1,200** |
| | | **Base CMA** | **0.794** |
| **Signal Coordination** | **None** | **Signal Coordination Adjustment** | **0.000** |
| | | **Final CMA** | **0.794** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 729 | | 468 | 468 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 468 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 207 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **468** |
| Eastbound | Left | 1 | 113 | | 113 | 113 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 746 | | 373 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 955 | | 478 | 478 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 560 | 468 | 92 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **591** |
| | | | **Total Intersection Critical Volumes** | | | **1,059** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.706** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.606** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 487 | | 268 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,657 | | 638 | 638 |
| | Through/Right | 1 | | | 638 | |
| | Right | 0 | 258 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 2 | 230 | | 126 | 126 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,215 | | 441 | |
| | Through/Right | 1 | | | 441 | |
| | Right | 0 | 107 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **764** |
| Eastbound | Left | 2 | 109 | | 60 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 905 | | 452 | 452 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 522 | 268 | 254 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 2 | 281 | | 155 | 155 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 820 | | 410 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 297 | 126 | 171 | |
| | Total Lanes | 5 | | | | |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **607** |
| | | **Total Intersection Critical Volumes** | **1,371** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.997** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.897** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 8 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 186 | | 184 | 184 |
| | Left/Through | 1 | | | 184 | |
| | Through | 0 | 183 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 343 | 343 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 503 | | 326 | 326 |
| | Left/Through | 1 | | | 326 | |
| | Through | 0 | 148 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 81 | 55 | 26 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **510** |
| Eastbound | Left | 1 | 55 | | 55 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,077 | | 538 | 538 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 297 | 184 | 113 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 508 | | 508 | 508 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,198 | | 495 | |
| | Through/Right | 1 | | | 495 | |
| | Right | 0 | 286 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **1,046** |
| | | | **Total Intersection Critical Volumes** | | | **1,556** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.132** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.032** |
| | | | **Level of Service (LOS)** | | | **F** |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 335 | | 168 | 168 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 493 | 493 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 599 | | 599 | 599 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 374 | | 125 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **767** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 1,016 | | 559 | 559 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 445 | 445 | 0 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **559** |
| | | **Total Intersection Critical Volumes** | **1,326** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.931** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.831** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 10 **Date** October 7, 2013
**Intersection Name** North/South: Palawan Way
East/West: Admiralty Way
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 0 | 32 | | | |
| | Through/Right | 1 | | | 72 | 72 |
| | Right | 0 | 40 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 369 | | 369 | 369 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 64 | | 64 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 171 | 24 | 147 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **441** |
| | Left | 1 | 49 | | 49 | 49 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 1,078 | | 544 | |
| | Through/Right | 1 | | | 544 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 72 | | 72 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 1,238 | | 664 | 664 |
| | Through/Right | 1 | | | 664 | |
| | Right | 0 | 90 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **713** |
| | | | **Total Intersection Critical Volumes** | | | **1,154** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.769** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.669** |
| | | | **Level of Service (LOS)** | | | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 11 **Date** October 7, 2013
**Intersection Name** North/South: Lincoln Boulevard
East/West: Maxella Avenue/Marina Pointe Drive
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 194 | | 107 | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,064 | | 688 | 688 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 266 | 176 | 90 | |
| | Total Lanes | 6 | | | | |
| Southbound | Left | 2 | 143 | | 79 | 79 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,857 | | 492 | |
| | Through/Right | 1 | | | 492 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **767** |
| Eastbound | Left | 1 | 80 | | 80 | 80 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 72 | | 72 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 45 | 45 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 264 | | 176 | 176 |
| | Left/Through | 1 | | | 176 | |
| | Through | 0 | 89 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 174 | 79 | 95 | |
| | Total Lanes | 3 | | | | |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **256** |
| **Total Intersection Critical Volumes** | **1,023** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.744** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.644** |
| **Level of Service (LOS)** | **B** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue | | |
| | East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 125 | | 125 | 125 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 521 | | 521 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 82 | 82 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 51 | | 51 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 703 | | 450 | 450 |
| | Through/Right | 1 | | | 450 | |
| | Right | 0 | 198 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **575** |
| | Left | 1 | 191 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 137 | | 137 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 199 | 62 | 137 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 101 | | 101 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 180 | | 124 | 124 |
| | Through/Right | 1 | | | 124 | |
| | Right | 0 | 67 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **315** |
| | | **Total Intersection Critical Volumes** | **890** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.593** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.493** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 13 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 1,647 | | 623 | 623 |
| | Through/Right | 1 | | | 623 | |
| | Right | 0 | 222 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 815 | | 448 | 448 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,488 | | 496 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,071** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 200 | | 110 | 110 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 900 | 896 | 2 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **110** |
| | | | **Total Intersection Critical Volumes** | | | **1,181** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.829** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.729** |
| | | | **Level of Service (LOS)** | | | **C** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 14 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Admiralty Way | | |
| | East/West: | Bali Way | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Existing (2013) | | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 11 | | 11 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,246 | | 678 | 678 |
| | Through/Right | 1 | | | 678 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 262 | | 262 | 262 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,343 | | 676 | |
| | Through/Right | 1 | | | 676 | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **940** |
| Eastbound | Left | 0 | 16 | | | 16 |
| | Left/Through | 1 | | | 24 | |
| | Through | 0 | 21 | | | |
| | Through/Right | 1 | | | 24 | |
| | Right | 0 | 12 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 11 | | | |
| | Through/Right | 1 | | | 78 | |
| | Right | 1 | 406 | 262 | 78 | 78 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **94** |
| | | | **Total Intersection Critical Volumes** | | | **1,034** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.752** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.652** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 148 | | 148 | 148 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 1,587 | | 535 | |
| | Through/Right | 1 | | | 535 | |
| | Right | 0 | 19 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 2 | | 2 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,433 | | 576 | 576 |
| | Through/Right | 1 | | | 576 | |
| | Right | 0 | 296 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **724** |
| | Left | 1 | 324 | | 164 | 164 |
| | Left/Through | 1 | | | 164 | |
| Eastbound | Through | 0 | 4 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 74 | 74 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 6 | | | |
| | Left/Through | 0 | | | | |
| Westbound | Left/Through/Right | 1 | 0 | | 41 | 41 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 35 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **205** |
| | | **Total Intersection Critical Volumes** | **929** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.676** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.576** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 14 | | 14 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 768 | | 462 | 462 |
| | Through/Right | 1 | | | 462 | |
| | Right | 0 | 156 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 355 | | 355 | 355 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 950 | | 484 | |
| | Through/Right | 1 | | | 484 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **817** |
| | Left | 1 | 25 | | 25 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 43 | | | |
| | Through/Right | 1 | | | 64 | 64 |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 327 | | 176 | 176 |
| | Left/Through | 1 | | | 176 | |
| Westbound | Through | 0 | 26 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 486 | 355 | 131 | |
| | Total Lanes | 3 | | | | |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **240** |
| | | **Total Intersection Critical Volumes** | **1,057** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.769** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.669** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 290 | | 290 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 1,820 | | 607 | 607 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 406 | 305 | 101 | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 149 | | 149 | 149 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,256 | | 425 | |
| | Through/Right | 1 | | | 425 | |
| | Right | 0 | 19 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **756** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 357 | | 260 | 260 |
| | Through/Right | 1 | | | 260 | |
| | Right | 0 | 162 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 2 | 555 | | 305 | 305 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 890 | | 484 | |
| | Through/Right | 1 | | | 484 | |
| | Right | 0 | 79 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **565** |
| | | | **Total Intersection Critical Volumes** | | | **1,321** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.961** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.861** |
| | | | **Level of Service (LOS)** | | | **D** |

*NB Rt. Turn Overlap with WB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 30 | | 30 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 978 | | 494 | 494 |
| | Through/Right | 1 | | | 494 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **494** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 428 | | 296 | |
| | Through/Right | 1 | | | 296 | |
| | Right | 1 | 460 | 0 | 296 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 515 | | 283 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,493 | | 746 | 746 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **746** |
| | | **Total Intersection Critical Volumes** | **1,240** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.870** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.770** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 288 | | 288 | |
| | Left/Through | 1 | | | 525 | |
| | Through | 1 | 1,050 | | 525 | 525 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 384 | 202 | 182 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **525** |
| Eastbound | Left | 1 | 14 | | 14 | 14 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 412 | | 206 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,759 | | 597 | 597 |
| | Through/Right | 1 | | | 597 | |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **611** |
| | | | **Total Intersection Critical Volumes** | | | **1,136** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.797** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.697** |
| | | | **Level of Service (LOS)** | | | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 89 | | 89 | 89 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 202 | | 112 | |
| | Through/Right | 1 | | | 112 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 132 | | 132 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 201 | | 201 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 1,168 | 182 | 986 | 986 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,075** |
| | Left | 1 | 365 | | 365 | 365 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 403 | | 229 | |
| | Through/Right | 1 | | | 229 | |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 8 | | 8 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 442 | | 270 | 270 |
| | Through/Right | 1 | | | 270 | |
| | Right | 0 | 98 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **635** |
| | | **Total Intersection Critical Volumes** | **1,710** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **1.140** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.040** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 584 | | 321 | 321 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 78 | 53 | 25 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **321** |
| Eastbound | Left | 1 | 53 | | 53 | 53 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 196 | | 98 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 141 | | 141 | 141 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 545 | 545 | 0 | |
| | Total Lanes | 2 | | | | |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **194** |
| | | **Total Intersection Critical Volumes** | **515** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.343** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.243** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 535 | | 294 | 294 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,386 | | 802 | |
| | Through/Right | 1 | | | 802 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 26 | | 26 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,885 | | 656 | 656 |
| | Through/Right | 1 | | | 656 | |
| | Right | 0 | 82 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **950** |
| Eastbound | Left | 1 | 95 | | 95 | 95 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 16 | | 16 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 640 | 640 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 34 | | | |
| | Left/Through | 1 | | | 46 | |
| | Through | 0 | 20 | | | |
| | Through/Right | 1 | | | 46 | 46 |
| | Right | 0 | 38 | 0 | | |
| | Total Lanes | 2 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **141** |
| | | **Total Intersection Critical Volumes** | **1,091** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.793** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.693** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) EB On/Off-Ramps | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 85 | | 85 | 85 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 55 | |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **85** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 612 | | 204 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 188 | 15 | 86 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 254 | | 254 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,675 | | 838 | 838 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **838** |
| | | **Total Intersection Critical Volumes** | **923** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.615** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.515** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp<br>East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 518 | | 259 | 259 |
| | Left/Through | 1 | | | 259 | |
| | Through | 0 | 234 | | | |
| | Through/Right | 1 | | | 279 | |
| | Right | 0 | 45 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 142 | | 142 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 417 | 96 | 321 | 321 |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **580** |
| Eastbound | Left | 1 | 191 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 524 | | 262 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,008 | | 504 | 504 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 295 | 150 | 145 | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **695** |
| | | **Total Intersection Critical Volumes** | **1,275** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.895** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.795** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 28 | | 28 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 4 | 2,166 | | 542 | 542 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 439 | 210 | 229 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 334 | | 184 | 184 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,825 | | 553 | |
| | Through/Right | 1 | | | 553 | |
| | Right | 0 | 388 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **726** |
| | Left | 1 | 42 | | 42 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 140 | | 66 | 66 |
| | Through/Right | 1 | | | 66 | |
| | Right | 0 | 57 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 879 | | 483 | 483 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 273 | | 136 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 787 | 368 | 210 | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **549** |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,275** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.927** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.827** |
| | | **Level of Service (LOS)** | **D** |

**Existing (2013) With Project**

AM Peak Hour

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 172 | | 95 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,625 | | 879 | 879 |
| | Through/Right | 1 | | | 879 | |
| | Right | 0 | 133 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 179 | | 98 | 98 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,211 | | 629 | |
| | Through/Right | 1 | | | 629 | |
| | Right | 0 | 47 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **977** |
| | Left | 2 | 139 | | 76 | 76 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 3 | 841 | | 280 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 124 | 95 | 29 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 374 | | 206 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 995 | | 498 | 498 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 227 | 98 | 129 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **574** |
| | | | **Total Intersection Critical Volumes** | | | **1,551** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.128** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.028** |
| | | | **Level of Service (LOS)** | | | **F** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 2 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Pacific Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 135 | |
| | Through | 0 | 133 | | | |
| | Through/Right | 1 | | | 192 | 192 |
| | Right | 0 | 192 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 0 | 371 | | | |
| | Left/Through | 1 | | | 371 | 371 |
| | Through | 0 | 68 | | | |
| | Through/Right | 1 | | | 85 | |
| | Right | 0 | 17 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | Sum of North/South Critical Volumes | | | **563** |
| Eastbound | Left | 0 | 19 | | | 19 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 60 | | 92 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| Westbound | Left | 1 | 107 | | 107 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 64 | | 64 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 694 | 371 | 323 | 323 |
| | Total Lanes | 3 | | | | |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **342** |
| | | **Total Intersection Critical Volumes** | **905** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.635** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.535** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 135 | | 135 | 135 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 38 | | 38 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 195 | 46 | 149 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 0 | 4 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 5 | | 22 | 22 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **157** |
| Eastbound | Left | 1 | 12 | | 12 | 12 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 585 | | 292 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 43 | 43 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 70 | | 70 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 746 | | 373 | 373 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 48 | 4 | 44 | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **385** |
| | | **Total Intersection Critical Volumes** | **542** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.361** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.261** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 440 | | 242 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 337 | | 337 | 337 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 385 | 59 | 326 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 18 | | 18 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 127 | | | |
| | Through/Right | 1 | | | 195 | 195 |
| | Right | 0 | 68 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **532** |
| Eastbound | Left | 1 | 43 | | 43 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 599 | | 300 | 300 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 184 | 168 | 16 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 118 | | 118 | 118 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 395 | | 198 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 42 | 42 | 0 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **418** |
| | | **Total Intersection Critical Volumes** | **950** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.667** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.567** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 240 | 0 | 240 | 240 |
| | Total Lanes | 1 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **240** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 923 | | 462 | 462 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 84 | 84 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 156 | | 156 | 156 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 578 | | 289 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **618** |
| | | | **Total Intersection Critical Volumes** | | | **858** |
| **Number of Clearance Intervals** | | **0** | **Intersection Capacity** | | | **1,200** |
| | | | **Base CMA** | | | **0.715** |
| **Signal Coordination** | **None** | | **Signal Coordination Adjustment** | | | **0.000** |
| | | | **Final CMA** | | | **0.715** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 415 | | 269 | 269 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 269 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 123 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **269** |
| Eastbound | Left | 1 | 165 | | 165 | 165 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,049 | | 524 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 599 | | 300 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 828 | 269 | 559 | 559 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **724** |
| | | | **Total Intersection Critical Volumes** | | | **993** |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.662** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.562** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 511 | | 281 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,780 | | 658 | 658 |
| | Through/Right | 1 | | | 658 | |
| | Right | 0 | 194 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 2 | 306 | | 168 | 168 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,239 | | 458 | |
| | Through/Right | 1 | | | 458 | |
| | Right | 0 | 134 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **826** |
| Eastbound | Left | 2 | 129 | | 71 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 729 | | 364 | 364 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 564 | 281 | 283 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 2 | 141 | | 78 | 78 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 651 | | 326 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 211 | 168 | 43 | |
| | Total Lanes | 5 | | | | |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **442** |
| **Total Intersection Critical Volumes** | **1,268** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.922** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.822** |
| **Level of Service (LOS)** | **D** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | |
|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | |
| **Intersection Number** | 8 | **Date** October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway<br>East/West: Washington Boulevard | |
| **Intersection Control** | Signalized | |
| **Analysis Period** | AM Peak Hour | |
| **Analysis Scenario** | Existing (2013) With Project | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 255 | | 159 | 159 |
| | Left/Through | 1 | | | 159 | |
| | Through | 0 | 63 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 342 | 278 | 64 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 101 | | 71 | 71 |
| | Left/Through | 1 | | | 71 | |
| | Through | 0 | 41 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 23 | 22 | 1 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **230** |
| Eastbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,003 | | 502 | 502 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 132 | 132 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 278 | | 278 | 278 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 697 | | 287 | |
| | Through/Right | 1 | | | 287 | |
| | Right | 0 | 164 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **780** |
| | | **Total Intersection Critical Volumes** | **1,010** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.735** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.635** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 561 | | 280 | 280 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 753 | 753 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 260 | | 260 | 260 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 170 | | 57 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **540** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 342 | | 188 | 188 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 637 | 520 | 58 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **188** |
| | | | **Total Intersection Critical Volumes** | | | **728** |
| **Number of Clearance Intervals** | | **3** | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.511** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.411** |
| | | | **Level of Service (LOS)** | | | **A** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | |
|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | |
| **Intersection Number** | 10 | **Date** October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way<br>East/West: Admiralty Way | |
| **Intersection Control** | Signalized | |
| **Analysis Period** | AM Peak Hour | |
| **Analysis Scenario** | Existing (2013) With Project | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 28 | | 28 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 67 | | | |
| | Through/Right | 1 | | | 121 | 121 |
| | Right | 0 | 54 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 143 | | 143 | 143 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 94 | 45 | 49 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **264** |
| Eastbound | Left | 1 | 90 | | 90 | 90 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 879 | | 444 | |
| | Through/Right | 1 | | | 444 | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 45 | | 45 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 882 | | 492 | 492 |
| | Through/Right | 1 | | | 492 | |
| | Right | 0 | 103 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **582** |
| | | **Total Intersection Critical Volumes** | **846** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.564** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.464** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | |
|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | |
| **Intersection Number** | 11 | **Date** October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Maxella Avenue/Marina Pointe Drive | |
| **Intersection Control** | Signalized | |
| **Analysis Period** | AM Peak Hour | |
| **Analysis Scenario** | Existing (2013) With Project | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 56 | | 31 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,298 | | 766 | 766 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 215 | 106 | 109 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 120 | | 66 | 66 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,849 | | 476 | |
| | Through/Right | 1 | | | 476 | |
| | Right | 0 | 56 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **832** |
| | Left | 1 | 63 | | 63 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 79 | | 79 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 129 | 31 | 98 | 98 |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 183 | | 106 | 106 |
| | Left/Through | 1 | | | 106 | |
| Westbound | Through | 0 | 29 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 111 | 66 | 45 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **204** |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,036** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.753** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.653** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 79 | | 79 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 454 | | 454 | 454 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 60 | 58 | 2 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 22 | | 22 | 22 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 364 | | 220 | |
| | Through/Right | 1 | | | 220 | |
| | Right | 0 | 77 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **476** |
| | Left | 1 | 114 | | 114 | 114 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 76 | | 76 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 116 | 116 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 82 | | 82 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 86 | | 78 | 78 |
| | Through/Right | 1 | | | 78 | |
| | Right | 0 | 71 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **192** |
| | | **Total Intersection Critical Volumes** | **668** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.445** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.345** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 13 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,602 | | 630 | 630 |
| | Through/Right | 1 | | | 630 | |
| | Right | 0 | 289 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 868 | | 477 | 477 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,330 | | 443 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,107** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 148 | | 81 | 81 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 913 | 913 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **81** |
| | | | **Total Intersection Critical Volumes** | | | **1,188** |
| | | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.834** |
| | | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.734** |
| | | | **Level of Service (LOS)** | | | **C** |

**Number of Clearance Intervals** **3**

**Signal Coordination** **ATSAC + ATCS**

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 7 | | 7 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,042 | | 604 | 604 |
| | Through/Right | 1 | | | 604 | |
| | Right | 0 | 165 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 319 | | 319 | 319 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,277 | | 642 | |
| | Through/Right | 1 | | | 642 | |
| | Right | 0 | 7 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **923** |
| | Left | 0 | 12 | | | 12 |
| | Left/Through | 1 | | | 14 | |
| Eastbound | Through | 0 | 9 | | | |
| | Through/Right | 1 | | | 14 | |
| | Right | 0 | 6 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 29 | | | |
| | Through/Right | 1 | | | 29 | 29 |
| | Right | 1 | 298 | 298 | 0 | |
| | Total Lanes | 3 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **41** |
| | | **Total Intersection Critical Volumes** | **964** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.701** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.601** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 108 | | 108 | 108 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,534 | | 518 | |
| | Through/Right | 1 | | | 518 | |
| | Right | 0 | 20 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 3 | | 3 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,259 | | 489 | 489 |
| | Through/Right | 1 | | | 489 | |
| | Right | 0 | 208 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **597** |
| Eastbound | Left | 1 | 327 | | 164 | 164 |
| | Left/Through | 1 | | | 164 | |
| | Through | 0 | 2 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 141 | 54 | 87 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 2 | | 10 | 10 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **174** |
| | | | **Total Intersection Critical Volumes** | | | **771** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.561** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.461** |
| | | | **Level of Service (LOS)** | | | **A** |

*East/West Opposed Phasing*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 27 | | 27 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 864 | | 494 | 494 |
| | Through/Right | 1 | | | 494 | |
| | Right | 0 | 124 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 235 | | 235 | 235 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 981 | | 502 | |
| | Through/Right | 1 | | | 502 | |
| | Right | 0 | 24 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **729** |
| | Left | 1 | 40 | | 34 | |
| | Left/Through | 1 | | | 34 | |
| Eastbound | Through | 0 | 29 | | | |
| | Through/Right | 1 | | | 34 | 34 |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 118 | | 87 | |
| | Left/Through | 1 | | | 87 | |
| Westbound | Through | 0 | 56 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 374 | 235 | 139 | 139 |
| | Total Lanes | 3 | | | | |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **173** |
| | | **Total Intersection Critical Volumes** | **902** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.656** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.556** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 209 | | 209 | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,627 | | 876 | 876 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 478 | 156 | 322 | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 183 | | 183 | 183 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,485 | | 511 | |
| | Through/Right | 1 | | | 511 | |
| | Right | 0 | 47 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,059** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 159 | | 92 | 92 |
| | Through/Right | 1 | | | 92 | |
| | Right | 0 | 26 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 2 | 284 | | 156 | 156 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 396 | | 239 | |
| | Through/Right | 1 | | | 239 | |
| | Right | 0 | 82 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **248** |
| | | | **Total Intersection Critical Volumes** | | | **1,307** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.951** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.851** |
| | | | **Level of Service (LOS)** | | | **D** |

*NB Rt. Turn Overlap with WB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,111 | | 563 | 563 |
| | Through/Right | 1 | | | 563 | |
| | Right | 0 | 15 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **563** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 387 | | 284 | 284 |
| | Through/Right | 1 | | | 284 | |
| | Right | 1 | 464 | 0 | 284 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 347 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 821 | | 410 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **475** |
| | | | **Total Intersection Critical Volumes** | | | **1,038** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.728** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.628** |
| | | | **Level of Service (LOS)** | | | **B** |

## Hirsch/Green Transportation Consulting, Inc.
## Critical Movement Analysis (CMA) Worksheet

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 337 | | 337 | |
| | Left/Through | 1 | | | 480 | |
| | Through | 1 | 961 | | 480 | 480 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 381 | 38 | 343 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **480** |
| Eastbound | Left | 1 | 4 | | 4 | 4 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 404 | | 202 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 806 | | 274 | 274 |
| | Through/Right | 1 | | | 274 | |
| | Right | 0 | 16 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **278** |
| | | | **Total Intersection Critical Volumes** | | | **758** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.532** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.432** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 42 | | 42 | 42 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 168 | | 93 | |
| | Through/Right | 1 | | | 93 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 51 | | 51 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 135 | | 135 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 360 | 187 | 173 | 173 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **215** |
| Eastbound | Left | 1 | 374 | | 374 | 374 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 315 | | 198 | |
| | Through/Right | 1 | | | 198 | |
| | Right | 0 | 81 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 14 | | 14 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 395 | | 232 | 232 |
| | Through/Right | 1 | | | 232 | |
| | Right | 0 | 68 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **606** |
| | | **Total Intersection Critical Volumes** | **821** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.547** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.447** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 619 | | 340 | 340 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 47 | 43 | 4 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **340** |
| Eastbound | Left | 1 | 43 | | 43 | 43 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 91 | | 46 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 113 | | 113 | 113 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 656 | 656 | 0 | |
| | Total Lanes | 2 | | | | |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **156** |
| | | **Total Intersection Critical Volumes** | **496** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.331** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.231** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 626 | | 344 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 3,108 | | 1,049 | 1,049 |
| | Through/Right | 1 | | | 1,049 | |
| | Right | 0 | 38 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 38 | | 38 | 38 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,733 | | 594 | |
| | Through/Right | 1 | | | 594 | |
| | Right | 0 | 50 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,087** |
| Eastbound | Left | 1 | 176 | | 176 | 176 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 551 | 551 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 11 | | | |
| | Left/Through | 1 | | | 11 | 11 |
| | Through | 0 | 2 | | | |
| | Through/Right | 1 | | | 2 | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **187** |
| | | | **Total Intersection Critical Volumes** | | | **1,274** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.927** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.827** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Marina Freeway (SR-90) EB On/Off-Ramps | |
| | East/West: | Culver Boulevard | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | With Project | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 1 | 21 | | 21 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 116 | 116 |
| | Right | 0 | 116 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **116** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 3 | 1,829 | | 610 | 610 |
| | Through/Right | 0 | | | | |
| | Right | 2 | 832 | 0 | 416 | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 127 | | 127 | 127 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 480 | | 240 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **737** |
| | | **Total Intersection Critical Volumes** | **853** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.569** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.469** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 137 | | 137 | |
| | Left/Through | 1 | | | 196 | |
| | Through | 0 | 271 | | | |
| | Through/Right | 1 | | | 196 | 196 |
| | Right | 0 | 120 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 112 | | 112 | 112 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 157 | 157 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **308** |
| Eastbound | Left | 1 | 509 | | 509 | 509 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,460 | | 730 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 335 | | 168 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 325 | 56 | 269 | 269 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **778** |
| | | | **Total Intersection Critical Volumes** | | | **1,086** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.762** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.662** |
| | | | **Level of Service (LOS)** | | | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 20 | | 20 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 4 | 2,837 | | 709 | 709 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 713 | 77 | 636 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 558 | | 307 | 307 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,502 | | 440 | |
| | Through/Right | 1 | | | 440 | |
| | Right | 0 | 257 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,016** |
| | Left | 1 | 254 | | 254 | 254 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 385 | | 139 | |
| | Through/Right | 1 | | | 139 | |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 561 | | 309 | 309 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 154 | | 77 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 708 | 614 | 47 | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **563** |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,579** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.148** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.048** |
| | | **Level of Service (LOS)** | **F** |

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 147 | | 81 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,474 | | 826 | 826 |
| | Through/Right | 1 | | | 826 | |
| | Right | 0 | 179 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 2 | 168 | | 92 | 92 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 957 | | 497 | |
| | Through/Right | 1 | | | 497 | |
| | Right | 0 | 37 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **918** |
| Eastbound | Left | 2 | 114 | | 63 | 63 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 872 | | 291 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 143 | 81 | 62 | |
| | Total Lanes | 6 | | | | |
| Westbound | Left | 2 | 248 | | 136 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 935 | | 468 | 468 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 138 | 92 | 46 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **531** |
| | | | **Total Intersection Critical Volumes** | | | **1,449** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.054** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.954** |
| | | | **Level of Service (LOS)** | | | **E** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 2 **Date** October 7, 2013
**Intersection Name** North/South: Pacific Avenue
East/West: Washington Boulevard
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013) With Project

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 71 | |
| Northbound | Through | 0 | 69 | | | |
| | Through/Right | 1 | | | 128 | 128 |
| | Right | 0 | 128 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 0 | 685 | | | |
| | Left/Through | 1 | | | 685 | 685 |
| Southbound | Through | 0 | 118 | | | |
| | Through/Right | 1 | | | 144 | |
| | Right | 0 | 26 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **813** |
| | Left | 0 | 20 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Left/Through/Right | 1 | 91 | | 129 | 129 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 1 | | | | |
| | Left | 1 | 176 | | 176 | 176 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 60 | | 60 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 435 | 435 | 0 | |
| | Total Lanes | 3 | | | | |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **305** |
| | | **Total Intersection Critical Volumes** | **1,118** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.785** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.685** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 50 | | 50 | 50 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 11 | | 11 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 95 | 71 | 24 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 20 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Left/Through/Right | 1 | 28 | | 62 | 62 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 14 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **112** |
| | Left | 1 | 13 | | 13 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 752 | | 376 | 376 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 110 | 25 | 85 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 142 | | 142 | 142 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 660 | | 330 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 49 | 44 | 5 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **518** |
| | | | **Total Intersection Critical Volumes** | | | **630** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.420** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.320** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| **Approach Direction** | **Lane Type** | **No. of Lanes** | **Approach Volumes** | **Right-Turn on Red** | **Assigned Lane Volumes** | **Critical Moves** |
|---|---|---|---|---|---|---|
| | Left | 2 | 335 | | 184 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 242 | | 242 | 242 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 237 | 85 | 152 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 34 | | 34 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 447 | | | |
| | Through/Right | 1 | | | 556 | 556 |
| | Right | 0 | 109 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **798** |
| | Left | 1 | 37 | | 37 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 595 | | 298 | 298 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 346 | 121 | 225 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 170 | | 170 | 170 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 525 | | 262 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 47 | 47 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **468** |
| | | | **Total Intersection Critical Volumes** | | | **1,266** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.888** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.788** |
| | | | **Level of Service (LOS)** | | | **C** |

*North/South Opposed Phasing*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 155 | 0 | 155 | 155 |
| | Total Lanes | 1 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **155** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 727 | | 364 | 364 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 195 | 78 | 117 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 434 | | 434 | 434 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 762 | | 381 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **798** |
| | | | **Total Intersection Critical Volumes** | | | **953** |
| **Number of Clearance Intervals** | **0** | | **Intersection Capacity** | | | **1,200** |
| | | | **Base CMA** | | | **0.794** |
| **Signal Coordination** | **None** | | **Signal Coordination Adjustment** | | | **0.000** |
| | | | **Final CMA** | | | **0.794** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 6 **Date** October 7, 2013
**Intersection Name** North/South: Abbot Kinney Boulevard
East/West: Washington Boulevard
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013) With Project

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 739 | | 473 | 473 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 473 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 207 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **473** |
| Eastbound | Left | 1 | 113 | | 113 | 113 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 746 | | 373 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 955 | | 478 | 478 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 569 | 473 | 96 | |
| | Total Lanes | 3 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **591** |
| **Total Intersection Critical Volumes** | **1,064** |
| **Intersection Capacity** | **1,500** |
| **Base CMA** | **0.709** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.609** |
| **Level of Service (LOS)** | **B** |

**Number of Clearance Intervals** **2**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 496 | | 273 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 1,686 | | 652 | 652 |
| | Through/Right | 1 | | | 652 | |
| | Right | 0 | 271 | 0 | | |
| | Total Lanes | 5 | | | | |
| | Left | 2 | 230 | | 126 | 126 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,246 | | 451 | |
| | Through/Right | 1 | | | 451 | |
| | Right | 0 | 107 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **778** |
| | Left | 2 | 109 | | 60 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 905 | | 452 | 452 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 532 | 273 | 259 | |
| | Total Lanes | 5 | | | | |
| | Left | 2 | 298 | | 164 | 164 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 820 | | 410 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 297 | 126 | 171 | |
| | Total Lanes | 5 | | | | |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **616** |
| | | **Total Intersection Critical Volumes** | **1,394** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.014** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.914** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | |
|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | |
| **Intersection Number** | 8 | **Date** October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway<br>East/West: Washington Boulevard | |
| **Intersection Control** | Signalized | |
| **Analysis Period** | PM Peak Hour | |
| **Analysis Scenario** | Existing (2013) With Project | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 186 | | 184 | 184 |
| | Left/Through | 1 | | | 184 | |
| | Through | 0 | 183 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 346 | 346 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 503 | | 326 | 326 |
| | Left/Through | 1 | | | 326 | |
| | Through | 0 | 148 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 81 | 55 | 26 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **510** |
| Eastbound | Left | 1 | 55 | | 55 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,090 | | 545 | 545 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 297 | 184 | 113 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 512 | | 512 | 512 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,215 | | 500 | |
| | Through/Right | 1 | | | 500 | |
| | Right | 0 | 286 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **1,056** |
| | | **Total Intersection Critical Volumes** | **1,566** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.139** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.039** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 335 | | 168 | 168 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 513 | 513 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 610 | | 610 | 610 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 374 | | 125 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **778** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 1,035 | | 569 | 569 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 463 | 463 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **569** |
| | | | **Total Intersection Critical Volumes** | | | **1,347** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.945** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.845** |
| | | | **Level of Service (LOS)** | | | **D** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 32 | | | |
| | Through/Right | 1 | | | 72 | 72 |
| | Right | 0 | 40 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 380 | | 380 | 380 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 64 | | 64 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 171 | 24 | 147 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **452** |
| Eastbound | Left | 1 | 49 | | 49 | 49 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,109 | | 560 | |
| | Through/Right | 1 | | | 560 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 72 | | 72 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,275 | | 682 | 682 |
| | Through/Right | 1 | | | 682 | |
| | Right | 0 | 90 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **731** |
| | | | **Total Intersection Critical Volumes** | | | **1,183** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.789** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.689** |
| | | | **Level of Service (LOS)** | | | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 11 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Lincoln Boulevard | | |
| | East/West: | Maxella Avenue/Marina Pointe Drive | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Existing (2013) | With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 194 | | 107 | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,115 | | 705 | 705 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 266 | 176 | 90 | |
| | Total Lanes | 6 | | | | |
| Southbound | Left | 2 | 143 | | 79 | 79 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,915 | | 506 | |
| | Through/Right | 1 | | | 506 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **784** |
| Eastbound | Left | 1 | 80 | | 80 | 80 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 72 | | 72 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 45 | 45 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 264 | | 176 | 176 |
| | Left/Through | 1 | | | 176 | |
| | Through | 0 | 89 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 174 | 79 | 95 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **256** |
| | | | **Total Intersection Critical Volumes** | | | **1,040** |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.756** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.656** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 125 | | 125 | 125 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 524 | | 524 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 82 | 82 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 51 | | 51 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 707 | | 452 | 452 |
| | Through/Right | 1 | | | 452 | |
| | Right | 0 | 198 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **577** |
| | Left | 1 | 191 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 137 | | 137 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 199 | 62 | 137 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 101 | | 101 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 180 | | 124 | 124 |
| | Through/Right | 1 | | | 124 | |
| | Right | 0 | 67 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **315** |
| | | | **Total Intersection Critical Volumes** | | | **892** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.595** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.495** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 13 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,698 | | 640 | 640 |
| | Through/Right | 1 | | | 640 | |
| | Right | 0 | 222 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 815 | | 448 | 448 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,546 | | 515 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,088** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 200 | | 110 | 110 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 900 | 896 | 2 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **110** |
| | | **Total Intersection Critical Volumes** | **1,198** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.841** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.741** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 9 | | 9 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,275 | | 714 | 714 |
| | Through/Right | 1 | | | 714 | |
| | Right | 0 | 153 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 262 | | 262 | 262 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,381 | | 696 | |
| | Through/Right | 1 | | | 696 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **976** |
| Eastbound | Left | 0 | 24 | | | 24 |
| | Left/Through | 1 | | | 34 | |
| | Through | 0 | 33 | | | |
| | Through/Right | 1 | | | 34 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 49 | | 49 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 19 | | | |
| | Through/Right | 1 | | | 82 | |
| | Right | 1 | 406 | 262 | 82 | 82 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **106** |
| | | | **Total Intersection Critical Volumes** | | | **1,082** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.787** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.687** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 150 | | 150 | 150 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,587 | | 535 | |
| | Through/Right | 1 | | | 535 | |
| | Right | 0 | 19 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 2 | | 2 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,458 | | 596 | 596 |
| | Through/Right | 1 | | | 596 | |
| | Right | 0 | 329 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **746** |
| Eastbound | Left | 1 | 375 | | 190 | 190 |
| | Left/Through | 1 | | | 190 | |
| | Through | 0 | 4 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 78 | 75 | 3 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 6 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 41 | 41 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 35 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **231** |
| | | **Total Intersection Critical Volumes** | **977** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.711** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.611** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 777 | | 466 | 466 |
| | Through/Right | 1 | | | 466 | |
| | Right | 0 | 156 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 374 | | 374 | 374 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 959 | | 498 | |
| | Through/Right | 1 | | | 498 | |
| | Right | 0 | 36 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **840** |
| | Left | 1 | 97 | | 74 | |
| | Left/Through | 1 | | | 74 | |
| Eastbound | Through | 0 | 98 | | | |
| | Through/Right | 1 | | | 74 | 74 |
| | Right | 0 | 27 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 327 | | 215 | 215 |
| | Left/Through | 1 | | | 215 | |
| Westbound | Through | 0 | 103 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 522 | 374 | 148 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **289** |
| | | | **Total Intersection Critical Volumes** | | | **1,129** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.821** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.721** |
| | | | **Level of Service (LOS)** | | | **C** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 328 | | 328 | 328 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,821 | | 607 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 406 | 305 | 101 | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 151 | | 151 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,258 | | 434 | 434 |
| | Through/Right | 1 | | | 434 | |
| | Right | 0 | 44 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **762** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 406 | | 296 | 296 |
| | Through/Right | 1 | | | 296 | |
| | Right | 0 | 187 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 2 | 555 | | 305 | 305 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 940 | | 510 | |
| | Through/Right | 1 | | | 510 | |
| | Right | 0 | 80 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **601** |
| | | | **Total Intersection Critical Volumes** | | | **1,363** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.991** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.891** |
| | | | **Level of Service (LOS)** | | | **D** |

*NB Rt. Turn Overlap with WB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 30 | | 30 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 978 | | 494 | 494 |
| | Through/Right | 1 | | | 494 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **494** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 441 | | 313 | |
| | Through/Right | 1 | | | 313 | |
| | Right | 1 | 498 | 0 | 313 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 515 | | 283 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,544 | | 772 | 772 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **772** |
| | | | **Total Intersection Critical Volumes** | | | **1,266** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.888** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.788** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 324 | | 324 | |
| | Left/Through | 1 | | | 525 | |
| | Through | 1 | 1,050 | | 525 | 525 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 384 | 202 | 182 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **525** |
| Eastbound | Left | 1 | 14 | | 14 | 14 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 425 | | 212 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,774 | | 602 | 602 |
| | Through/Right | 1 | | | 602 | |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **616** |
| | | | **Total Intersection Critical Volumes** | | | **1,141** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.801** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.701** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 89 | | 89 | 89 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 202 | | 112 | |
| | Through/Right | 1 | | | 112 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 132 | | 132 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 201 | | 201 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 1,172 | 184 | 988 | 988 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,077** |
| | Left | 1 | 368 | | 368 | 368 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 413 | | 234 | |
| | Through/Right | 1 | | | 234 | |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 8 | | 8 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 453 | | 276 | 276 |
| | Through/Right | 1 | | | 276 | |
| | Right | 0 | 98 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **644** |
| | | **Total Intersection Critical Volumes** | **1,721** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **1.147** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.047** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 21 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Admiralty Way | | |
| | East/West: | Fiji Way | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Existing (2013) | With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 599 | | 329 | 329 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 78 | 53 | 25 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **329** |
| Eastbound | Left | 1 | 53 | | 53 | 53 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 196 | | 98 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 141 | | 141 | 141 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 562 | 562 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **194** |
| | | | **Total Intersection Critical Volumes** | | | **523** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.349** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.249** |
| | | | **Level of Service (LOS)** | | | **A** |

*SB Rt. Turn Overlap with EB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 22 **Date** October 7, 2013
**Intersection Name** North/South: Lincoln Boulevard
East/West: Fiji Way
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013) With Project

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 552 | | 304 | 304 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,425 | | 815 | |
| | Through/Right | 1 | | | 815 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 26 | | 26 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,912 | | 665 | 665 |
| | Through/Right | 1 | | | 665 | |
| | Right | 0 | 82 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **969** |
| Eastbound | Left | 1 | 95 | | 95 | 95 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 16 | | 16 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 655 | 655 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 34 | | | |
| | Left/Through | 1 | | | 46 | |
| | Through | 0 | 20 | | | |
| | Through/Right | 1 | | | 46 | 46 |
| | Right | 0 | 38 | 0 | | |
| | Total Lanes | 2 | | | | |

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **141** |
| **Total Intersection Critical Volumes** | **1,110** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.807** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.707** |
| **Level of Service (LOS)** | **C** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 23 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Marina Freeway (SR-90) EB On/Off-Ramps | | |
| | East/West: | Culver Boulevard | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Existing (2013) | With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 94 | | 94 | 94 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 55 | |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **94** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 612 | | 204 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 188 | 20 | 84 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 254 | | 254 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,679 | | 840 | 840 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **840** |
| | | | **Total Intersection Critical Volumes** | | | **934** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.623** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.523** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Marina Freeway (SR-90) WB Off-Ramp | |
| | East/West: | Culver Boulevard | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) | With Project | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 518 | | 259 | 259 |
| | Left/Through | 1 | | | 259 | |
| | Through | 0 | 234 | | | |
| | Through/Right | 1 | | | 279 | |
| | Right | 0 | 45 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 142 | | 142 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 417 | 96 | 321 | 321 |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **580** |
| Eastbound | Left | 1 | 191 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 533 | | 266 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,012 | | 506 | 506 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 301 | 150 | 151 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **697** |
| | | | **Total Intersection Critical Volumes** | | | **1,277** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.896** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.796** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 28 | | 28 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 4 | 2,188 | | 547 | 547 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 439 | 210 | 229 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 351 | | 193 | 193 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,842 | | 560 | |
| | Through/Right | 1 | | | 560 | |
| | Right | 0 | 396 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **740** |
| | Left | 1 | 42 | | 42 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 140 | | 66 | 66 |
| | Through/Right | 1 | | | 66 | |
| | Right | 0 | 57 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 879 | | 483 | 483 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 273 | | 136 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 807 | 386 | 210 | |
| | Total Lanes | 6 | | | | |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **549** |
| **Total Intersection Critical Volumes** | **1,289** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.937** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.837** |
| **Level of Service (LOS)** | **D** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Existing (2013) With Project Plus Project-Specific Mitigation**

***Intersection No. 16, Admiralty Way and Mindanao Way***

***(Assumes Completion of Currently Ongoing County Installation of Dual Southbound Left-Turn Lanes on Admiralty Way)***

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Existing (2013) With Project Plus County-Installed SB Dual Left-Turn Lanes | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 27 | | 27 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 864 | | 494 | 494 |
| | Through/Right | 1 | | | 494 | |
| | Right | 0 | 124 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 235 | | 129 | 129 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 981 | | 502 | |
| | Through/Right | 1 | | | 502 | |
| | Right | 0 | 24 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **623** |
| Eastbound | Left | 1 | 40 | | 34 | |
| | Left/Through | 1 | | | 34 | |
| | Through | 0 | 29 | | | |
| | Through/Right | 1 | | | 34 | 34 |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 118 | | 87 | |
| | Left/Through | 1 | | | 87 | |
| | Through | 0 | 56 | | 0 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 374 | 129 | 245 | 245 |
| | Total Lanes | 3 | | | | |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **279** |
| | | **Total Intersection Critical Volumes** | **902** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.656** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.556** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 16 **Date** October 7, 2013
**Intersection Name** North/South: Admiralty Way
East/West: Mindanao Way
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Existing (2013) With Project Plus County-Installed SB Dual Left-Turn Lanes

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 777 | | 466 | 466 |
| | Through/Right | 1 | | | 466 | |
| | Right | 0 | 156 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 374 | | 206 | 206 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 959 | | 498 | |
| | Through/Right | 1 | | | 498 | |
| | Right | 0 | 36 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **672** |
| Eastbound | Left | 1 | 97 | | 74 | |
| | Left/Through | 1 | | | 74 | |
| | Through | 0 | 98 | | | |
| | Through/Right | 1 | | | 74 | 74 |
| | Right | 0 | 27 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 327 | | 215 | |
| | Left/Through | 1 | | | 215 | |
| | Through | 0 | 103 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 522 | 206 | 316 | 316 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **390** |
| | | | **Total Intersection Critical Volumes** | | | **1,062** |
| | | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.772** |
| | | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.672** |
| | | | **Level of Service (LOS)** | | | **B** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

***No Feasible Mitigation For:***

***Intersection No. 1, Lincoln Boulevard and Venice Boulevard,***

***Intersection No. 7, Lincoln Boulevard and Washington Boulevard,***

***or***

***Intersection No. 17, Lincoln Boulevard and Mindanao Way***

Future (2016) With Ambient Growth

(Los Angeles County Intersections Only)

## AM Peak Hour

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 571 | | 286 | 286 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 761 | 761 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 262 | | 262 | 262 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 173 | | 58 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **548** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 345 | | 190 | 190 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 646 | 524 | 61 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **190** |
| | | | **Total Intersection Critical Volumes** | | | **738** |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.518** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.418** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 29 | | | |
| | Left/Through | 1 | | | 76 | |
| | Through | 0 | 68 | | | |
| | Through/Right | 1 | | | 76 | 76 |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 143 | | 143 | 143 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 96 | 46 | 50 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **219** |
| Eastbound | Left | 1 | 92 | | 92 | 92 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 886 | | 447 | |
| | Through/Right | 1 | | | 447 | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 46 | | 46 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 893 | | 446 | 446 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 105 | 25 | 80 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **538** |
| | | **Total Intersection Critical Volumes** | **757** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.531** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.431** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 12 | | 12 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,055 | | 608 | 608 |
| | Through/Right | 1 | | | 608 | |
| | Right | 0 | 160 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 325 | | 179 | 179 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,289 | | 648 | |
| | Through/Right | 1 | | | 648 | |
| | Right | 0 | 6 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **787** |
| Eastbound | Left | 0 | 13 | | | 13 |
| | Left/Through | 1 | | | 14 | |
| | Through | 0 | 8 | | | |
| | Through/Right | 1 | | | 14 | |
| | Right | 0 | 7 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 30 | | | |
| | Through/Right | 1 | | | 77 | |
| | Right | 1 | 303 | 179 | 77 | 77 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **90** |
| | | | **Total Intersection Critical Volumes** | | | **877** |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.638** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.538** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 24 | | 24 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 880 | | 503 | 503 |
| | Through/Right | 1 | | | 503 | |
| | Right | 0 | 126 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 239 | | 131 | 131 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 999 | | 508 | |
| | Through/Right | 1 | | | 508 | |
| | Right | 0 | 17 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **634** |
| Eastbound | Left | 1 | 26 | | 26 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 18 | | | |
| | Through/Right | 1 | | | 51 | 51 |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 120 | | 70 | |
| | Left/Through | 1 | | | 70 | |
| | Through | 0 | 21 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 378 | 131 | 247 | 247 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **298** |
| | | | **Total Intersection Critical Volumes** | | | **932** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.678** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.578** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 629 | | 346 | 346 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 48 | 44 | 4 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **346** |
| Eastbound | Left | 1 | 44 | | 44 | 44 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 93 | | 46 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 115 | | 115 | 115 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 665 | 665 | 0 | |
| | Total Lanes | 2 | | | | |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **159** |
| | | **Total Intersection Critical Volumes** | **505** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.337** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.237** |
| | | **Level of Service (LOS)** | **A** |

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 341 | | 170 | 170 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 502 | 502 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 610 | | 610 | 610 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 381 | | 127 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **780** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 1,034 | | 569 | 569 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 453 | 453 | 0 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **569** |
| | | **Total Intersection Critical Volumes** | **1,349** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.947** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.847** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 16 | | | |
| | Left/Through | 1 | | | 45 | |
| | Through | 0 | 33 | | | |
| | Through/Right | 1 | | | 45 | 45 |
| | Right | 0 | 41 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 376 | | 376 | 376 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 65 | | 65 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 174 | 25 | 149 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **421** |
| Eastbound | Left | 1 | 50 | | 50 | 50 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,098 | | 554 | |
| | Through/Right | 1 | | | 554 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 73 | | 73 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,260 | | 630 | 630 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 92 | 74 | 18 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **680** |
| | | **Total Intersection Critical Volumes** | **1,101** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.773** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.673** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 11 | | 11 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,269 | | 690 | 690 |
| | Through/Right | 1 | | | 690 | |
| | Right | 0 | 112 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 267 | | 147 | 147 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,367 | | 688 | |
| | Through/Right | 1 | | | 688 | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **837** |
| | Left | 0 | 16 | | | 16 |
| | Left/Through | 1 | | | 21 | |
| Eastbound | Through | 0 | 21 | | | |
| | Through/Right | 1 | | | 28 | |
| | Right | 0 | 12 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 11 | | | |
| | Through/Right | 1 | | | 138 | |
| | Right | 1 | 413 | 147 | 138 | 138 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **154** |
| | | | **Total Intersection Critical Volumes** | | | **991** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.721** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.621** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 14 | | 14 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 782 | | 470 | 470 |
| | Through/Right | 1 | | | 470 | |
| | Right | 0 | 159 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 361 | | 199 | 199 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 967 | | 492 | |
| | Through/Right | 1 | | | 492 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **669** |
| Eastbound | Left | 1 | 25 | | 25 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 44 | | | |
| | Through/Right | 1 | | | 65 | 65 |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 333 | | 180 | 180 |
| | Left/Through | 1 | | | 180 | |
| | Through | 0 | 26 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 495 | 199 | 296 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **361** |
| | | | **Total Intersection Critical Volumes** | | | **1,030** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.749** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.649** |
| | | | **Level of Service (LOS)** | | | **B** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 21 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Admiralty Way | | |
| | East/West: | Fiji Way | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Future (2016) | With Ambient Growth Only (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 595 | | 327 | 327 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 79 | 54 | 25 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **327** |
| Eastbound | Left | 1 | 54 | | 54 | 54 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 200 | | 100 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 144 | | 144 | 144 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 555 | 555 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **198** |
| | | | **Total Intersection Critical Volumes** | | | **525** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.350** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.250** |
| | | | **Level of Service (LOS)** | | | **A** |

*SB Rt. Turn Overlap with EB Left*

## Future (2016) With Ambient Growth Plus Project
## (Los Angeles County Intersections Only)

## AM Peak Hour

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 571 | | 286 | 286 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 767 | 767 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 265 | | 265 | 265 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 173 | | 58 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **551** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 348 | | 191 | 191 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 648 | 530 | 59 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **191** |
| | | **Total Intersection Critical Volumes** | **742** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.521** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.421** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 29 | | | |
| | Left/Through | 1 | | | 76 | |
| | Through | 0 | 68 | | | |
| | Through/Right | 1 | | | 76 | 76 |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 146 | | 146 | 146 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 96 | 46 | 50 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **222** |
| Eastbound | Left | 1 | 92 | | 92 | 92 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 895 | | 452 | |
| | Through/Right | 1 | | | 452 | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 46 | | 46 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 898 | | 449 | 449 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 105 | 25 | 80 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **540** |
| | | **Total Intersection Critical Volumes** | **762** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.535** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.435** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 7 | | 7 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,061 | | 614 | 614 |
| | Through/Right | 1 | | | 614 | |
| | Right | 0 | 168 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 325 | | 179 | 179 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,300 | | 654 | |
| | Through/Right | 1 | | | 654 | |
| | Right | 0 | 7 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **793** |
| | Left | 0 | 12 | | | 12 |
| | Left/Through | 1 | | | 14 | |
| Eastbound | Through | 0 | 9 | | | |
| | Through/Right | 1 | | | 14 | |
| | Right | 0 | 6 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 30 | | | |
| | Through/Right | 1 | | | 77 | |
| | Right | 1 | 303 | 179 | 77 | 77 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **89** |
| | | | **Total Intersection Critical Volumes** | | | **882** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.641** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.541** |
| | | | **Level of Service (LOS)** | | | **A** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 27 | | 27 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 880 | | 503 | 503 |
| | Through/Right | 1 | | | 503 | |
| | Right | 0 | 126 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 239 | | 131 | 131 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 999 | | 512 | |
| | Through/Right | 1 | | | 512 | |
| | Right | 0 | 24 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **634** |
| | Left | 1 | 40 | | 34 | |
| | Left/Through | 1 | | | 34 | |
| Eastbound | Through | 0 | 29 | | | |
| | Through/Right | 1 | | | 34 | 34 |
| | Right | 0 | 34 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 120 | | 88 | |
| | Left/Through | 1 | | | 88 | |
| Westbound | Through | 0 | 56 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 381 | 131 | 250 | 250 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **284** |
| | | | **Total Intersection Critical Volumes** | | | **918** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.668** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.568** |
| | | | **Level of Service (LOS)** | | | **A** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 630 | | 346 | 346 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 48 | 44 | 4 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **346** |
| | Left | 1 | 44 | | 44 | 44 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 93 | | 46 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 115 | | 115 | 115 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 668 | 668 | 0 | |
| | Total Lanes | 2 | | | | |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **159** |
| | | **Total Intersection Critical Volumes** | **505** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.337** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.237** |
| | | **Level of Service (LOS)** | **A** |

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 341 | | 170 | 170 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 522 | 522 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 621 | | 621 | 621 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 381 | | 127 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **791** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 1,053 | | 579 | 579 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 471 | 471 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **579** |
| | | | **Total Intersection Critical Volumes** | | | **1,370** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.961** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.861** |
| | | | **Level of Service (LOS)** | | | **D** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 10 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Palawan Way | | |
| | East/West: | Admiralty Way | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Future (2016) | With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 16 | | | |
| | Left/Through | 1 | | | 45 | |
| Northbound | Through | 0 | 33 | | | |
| | Through/Right | 1 | | | 45 | 45 |
| | Right | 0 | 41 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 386 | | 386 | 386 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 65 | | 65 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 174 | 25 | 149 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **431** |
| | Left | 1 | 50 | | 50 | 50 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 1,129 | | 570 | |
| | Through/Right | 1 | | | 570 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 73 | | 73 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 1,297 | | 648 | 648 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 92 | 74 | 18 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **698** |
| | | | **Total Intersection Critical Volumes** | | | **1,129** |
| **Number of Clearance Intervals** | | **3** | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.792** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.692** |
| | | | **Level of Service (LOS)** | | | **B** |

*North/South Opposed Phasing*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 9 | | 9 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,298 | | 726 | 726 |
| | Through/Right | 1 | | | 726 | |
| | Right | 0 | 155 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 267 | | 147 | 147 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,405 | | 708 | |
| | Through/Right | 1 | | | 708 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **873** |
| Eastbound | Left | 0 | 24 | | | 24 |
| | Left/Through | 1 | | | 28 | |
| | Through | 0 | 33 | | | |
| | Through/Right | 1 | | | 38 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 49 | | 49 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 19 | | | |
| | Through/Right | 1 | | | 142 | |
| | Right | 1 | 413 | 147 | 142 | 142 |
| | Total Lanes | 3 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **166** |
| | | **Total Intersection Critical Volumes** | **1,039** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.756** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.656** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 791 | | 475 | 475 |
| | Through/Right | 1 | | | 475 | |
| | Right | 0 | 159 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 380 | | 209 | 209 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 976 | | 506 | |
| | Through/Right | 1 | | | 506 | |
| | Right | 0 | 36 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **684** |
| | Left | 1 | 97 | | 74 | |
| | Left/Through | 1 | | | 74 | |
| Eastbound | Through | 0 | 99 | | | |
| | Through/Right | 1 | | | 74 | 74 |
| | Right | 0 | 27 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 333 | | 218 | |
| | Left/Through | 1 | | | 218 | |
| Westbound | Through | 0 | 103 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 531 | 209 | 322 | 322 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **396** |
| | | | **Total Intersection Critical Volumes** | | | **1,080** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.785** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.685** |
| | | | **Level of Service (LOS)** | | | **B** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Ambient Growth Plus Project (LACo Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 610 | | 336 | 336 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 79 | 54 | 25 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **336** |
| Eastbound | Left | 1 | 54 | | 54 | 54 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 200 | | 100 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 144 | | 144 | 144 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 572 | 572 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **198** |
| | | | **Total Intersection Critical Volumes** | | | **534** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.356** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.256** |
| | | | **Level of Service (LOS)** | | | **A** |

*SB Rt. Turn Overlap with EB Left*

**Future (2016) With Ambient Growth Plus Project Plus Project-Specific Mitigation**

**(Los Angeles County Intersections Only)**

***No Project-Specific Significant Impacts Under This Analysis Scenario***

***(No Mitigation Required)***

## Future (2016) Without Project

## (City of Los Angeles Intersections Only)

# AM Peak Hour

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 238 | | 131 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,912 | | 1,038 | 1,038 |
| | Through/Right | 1 | | | 1,038 | |
| | Right | 0 | 165 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 193 | | 106 | 106 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,500 | | 774 | |
| | Through/Right | 1 | | | 774 | |
| | Right | 0 | 49 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,144** |
| | Left | 2 | 143 | | 79 | 79 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 3 | 859 | | 286 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 210 | 131 | 79 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 402 | | 221 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 1,016 | | 508 | 508 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 247 | 106 | 141 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **587** |
| | | | **Total Intersection Critical Volumes** | | | **1,731** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.259** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.159** |
| | | | **Level of Service (LOS)** | | | **F** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 2 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Pacific Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 137 | |
| | Through | 0 | 135 | | | |
| | Through/Right | 1 | | | 195 | 195 |
| | Right | 0 | 195 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 0 | 398 | | | |
| | Left/Through | 1 | | | 398 | 398 |
| | Through | 0 | 69 | | | |
| | Through/Right | 1 | | | 86 | |
| | Right | 0 | 17 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **593** |
| Eastbound | Left | 0 | 19 | | | 19 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 61 | | 93 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| Westbound | Left | 1 | 109 | | 109 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 65 | | 65 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 736 | 398 | 338 | 338 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **357** |
| | | | **Total Intersection Critical Volumes** | | | **950** |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.667** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.567** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 150 | | 150 | 150 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 39 | | 39 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 199 | 48 | 151 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 0 | 9 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 5 | | 27 | 27 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **177** |
| Eastbound | Left | 1 | 12 | | 12 | 12 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 611 | | 306 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 49 | 49 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 71 | | 71 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 781 | | 390 | 390 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 54 | 13 | 41 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **402** |
| | | | **Total Intersection Critical Volumes** | | | **579** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.386** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.286** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 475 | | 261 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 352 | | 352 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 511 | 79 | 432 | 432 |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 18 | | 18 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 133 | | | |
| | Through/Right | 1 | | | 202 | 202 |
| | Right | 0 | 69 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **634** |
| | Left | 1 | 44 | | 44 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 621 | | 310 | 310 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 201 | 201 | 0 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 159 | | 159 | 159 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 402 | | 201 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 43 | 43 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **469** |
| | | | **Total Intersection Critical Volumes** | | | **1,103** |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.774** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.674** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 351 | 0 | 351 | 351 |
| | Total Lanes | 1 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **351** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,062 | | 531 | 531 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 93 | 93 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 215 | | 215 | 215 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 627 | | 314 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **746** |
| | | | **Total Intersection Critical Volumes** | | | **1,097** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **0** | **Intersection Capacity** | **1,200** |
| | | **Base CMA** | **0.914** |
| **Signal Coordination** | **None** | **Signal Coordination Adjustment** | **0.000** |
| | | **Final CMA** | **0.914** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 434 | | 282 | 282 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 282 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 130 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **282** |
| Eastbound | Left | 1 | 177 | | 177 | 177 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,288 | | 644 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 700 | | 350 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 848 | 282 | 566 | 566 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **743** |
| | | | **Total Intersection Critical Volumes** | | | **1,025** |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.683** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.583** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 536 | | 295 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,070 | | 765 | 765 |
| | Through/Right | 1 | | | 765 | |
| | Right | 0 | 225 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 2 | 339 | | 186 | 186 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,578 | | 581 | |
| | Through/Right | 1 | | | 581 | |
| | Right | 0 | 164 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **951** |
| Eastbound | Left | 2 | 208 | | 114 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 878 | | 439 | 439 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 603 | 295 | 308 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 2 | 158 | | 87 | 87 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 714 | | 357 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 245 | 186 | 59 | |
| | Total Lanes | 5 | | | | |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **526** |
| | | **Total Intersection Critical Volumes** | **1,477** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.074** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.974** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 8 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 260 | | 162 | 162 |
| | Left/Through | 1 | | | 162 | |
| | Through | 0 | 64 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 351 | 285 | 66 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 103 | | 72 | 72 |
| | Left/Through | 1 | | | 72 | |
| | Through | 0 | 42 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 23 | 22 | 1 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **234** |
| Eastbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,217 | | 608 | 608 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 134 | 134 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 285 | | 285 | 285 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 800 | | 322 | |
| | Through/Right | 1 | | | 322 | |
| | Right | 0 | 167 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **893** |
| | | | **Total Intersection Critical Volumes** | | | **1,127** |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.820** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.720** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 11 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Lincoln Boulevard | | |
| | East/West: | Maxella Avenue/Marina Pointe Drive | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | AM Peak Hour | | | |
| **Analysis Scenario** | Future (2016) | Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 57 | | 31 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,624 | | 875 | 875 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 225 | 124 | 101 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 131 | | 72 | 72 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 2,224 | | 570 | |
| | Through/Right | 1 | | | 570 | |
| | Right | 0 | 57 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **947** |
| | Left | 1 | 64 | | 64 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 80 | | 80 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 131 | 31 | 100 | 100 |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 218 | | 124 | 124 |
| | Left/Through | 1 | | | 124 | |
| Westbound | Through | 0 | 30 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 148 | 72 | 76 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **224** |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | |
|---|---|---|
| | **Total Intersection Critical Volumes** | **1,171** |
| **Number of Clearance Intervals** 4 | **Intersection Capacity** | **1,375** |
| | **Base CMA** | **0.852** |
| **Signal Coordination** ATSAC + ATCS | **Signal Coordination Adjustment** | **-0.100** |
| | **Final CMA** | **0.752** |
| | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 86 | | 86 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 465 | | 465 | 465 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 61 | 58 | 3 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 22 | | 22 | 22 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 373 | | 226 | |
| | Through/Right | 1 | | | 226 | |
| | Right | 0 | 78 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **487** |
| Eastbound | Left | 1 | 116 | | 116 | 116 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 82 | | 82 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 154 | 130 | 24 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 83 | | 83 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 90 | | 81 | 81 |
| | Through/Right | 1 | | | 81 | |
| | Right | 0 | 72 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **197** |
| | | **Total Intersection Critical Volumes** | **684** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.456** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.356** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 13 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 1,869 | | 721 | 721 |
| | Through/Right | 1 | | | 721 | |
| | Right | 0 | 294 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 924 | | 508 | 508 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,688 | | 563 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,229** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 151 | | 83 | 83 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 983 | 983 | 0 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **83** |
| | | **Total Intersection Critical Volumes** | **1,312** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.921** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.821** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 118 | | 118 | 118 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,800 | | 607 | |
| | Through/Right | 1 | | | 607 | |
| | Right | 0 | 20 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 3 | | 3 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,619 | | 609 | 609 |
| | Through/Right | 1 | | | 609 | |
| | Right | 0 | 209 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **727** |
| Eastbound | Left | 1 | 333 | | 168 | 168 |
| | Left/Through | 1 | | | 168 | |
| | Through | 0 | 2 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 152 | 59 | 93 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 2 | | 10 | 10 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **178** |
| | | **Total Intersection Critical Volumes** | **905** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.658** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.558** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 17 **Date** October 7, 2013
**Intersection Name** North/South: Lincoln Boulevard
East/West: Mindanao Way
**Intersection Control** Signalized
**Analysis Period** AM Peak Hour
**Analysis Scenario** Future (2016) Without Project (LADOT Only)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 205 | | 205 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,921 | | 974 | 974 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 499 | 168 | 331 | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 185 | | 185 | 185 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,847 | | 635 | |
| | Through/Right | 1 | | | 635 | |
| | Right | 0 | 59 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | Sum of North/South Critical Volumes | | | 1,159 |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 379 | | 200 | 200 |
| | Through/Right | 1 | | | 200 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 2 | 305 | | 168 | 168 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 494 | | 288 | |
| | Through/Right | 1 | | | 288 | |
| | Right | 0 | 83 | 0 | | |
| | Total Lanes | 4 | | | | |

*NB Rt. Turn Overlap with WB Left*

**Sum of East/West Critical Volumes** **368**
**Total Intersection Critical Volumes** **1,527**
**Number of Clearance Intervals** **4**
**Intersection Capacity** **1,375**
**Base CMA** **1.111**
**Signal Coordination** **ATSAC + ATCS**
**Signal Coordination Adjustment** **-0.100**
**Final CMA** **1.011**
**Level of Service (LOS)** **F**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,171 | | 593 | 593 |
| | Through/Right | 1 | | | 593 | |
| | Right | 0 | 15 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **593** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 413 | | 365 | 365 |
| | Through/Right | 1 | | | 365 | |
| | Right | 1 | 681 | 0 | 365 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 378 | | 208 | 208 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 943 | | 472 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **573** |
| | | **Total Intersection Critical Volumes** | **1,166** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.818** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.718** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 437 | | 437 | |
| | Left/Through | 1 | | | 516 | |
| Northbound | Through | 1 | 1,031 | | 516 | 516 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 391 | 41 | 350 | |
| | Total Lanes | 4 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **516** |
| | Left | 1 | 4 | | 4 | 4 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 428 | | 214 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 859 | | 292 | 292 |
| | Through/Right | 1 | | | 292 | |
| | Right | 0 | 16 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **296** |
| | | | **Total Intersection Critical Volumes** | | | **812** |

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.570** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.470** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 43 | | 43 | 43 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 171 | | 94 | |
| | Through/Right | 1 | | | 94 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 63 | | 63 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 137 | | 137 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 394 | 194 | 200 | 200 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **243** |
| Eastbound | Left | 1 | 387 | | 387 | 387 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 337 | | 210 | |
| | Through/Right | 1 | | | 210 | |
| | Right | 0 | 82 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 14 | | 14 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 413 | | 242 | 242 |
| | Through/Right | 1 | | | 242 | |
| | Right | 0 | 72 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **629** |
| | | **Total Intersection Critical Volumes** | **872** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.581** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.481** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 718 | | 395 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 3,374 | | 1,138 | 1,138 |
| | Through/Right | 1 | | | 1,138 | |
| | Right | 0 | 39 | 0 | | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 39 | | 39 | 39 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 2,071 | | 719 | |
| | Through/Right | 1 | | | 719 | |
| | Right | 0 | 85 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,177** |
| | Left | 1 | 219 | | 219 | 219 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 706 | 706 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 11 | | | |
| | Left/Through | 1 | | | 11 | 11 |
| Westbound | Through | 0 | 2 | | | |
| | Through/Right | 1 | | | 2 | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **230** |
| | | | **Total Intersection Critical Volumes** | | | **1,407** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.023** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.923** |
| | | | **Level of Service (LOS)** | | | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) EB On/Off-Ramps<br>East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 62 | | 62 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 118 | 118 |
| | Right | 0 | 118 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **118** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,876 | | 625 | 625 |
| | Through/Right | 0 | | | | |
| | Right | 2 | 855 | 0 | 428 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 129 | | 129 | 129 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 503 | | 252 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **754** |
| | | **Total Intersection Critical Volumes** | **872** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.581** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.481** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp<br>East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 146 | | 146 | |
| | Left/Through | 1 | | | 199 | |
| | Through | 0 | 276 | | | |
| | Through/Right | 1 | | | 199 | 199 |
| | Right | 0 | 122 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 114 | | 114 | 114 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 160 | 160 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **313** |
| Eastbound | Left | 1 | 518 | | 518 | 518 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,541 | | 770 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 348 | | 174 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 352 | 57 | 295 | 295 |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **813** |
| | | **Total Intersection Critical Volumes** | **1,126** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.790** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.690** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 20 | | 20 | |
| | Left/Through | 0 | | | | |
| | Through | 4 | 2,962 | | 740 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 925 | 82 | 843 | 843 |
| | Total Lanes | 6 | | | | |
| Southbound | Left | 2 | 889 | | 489 | 489 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,645 | | 482 | |
| | Through/Right | 1 | | | 482 | |
| | Right | 0 | 282 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,332** |
| Eastbound | Left | 1 | 259 | | 259 | 259 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 406 | | 146 | |
| | Through/Right | 1 | | | 146 | |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 2 | 772 | | 425 | 425 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 164 | | 82 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 925 | 925 | 0 | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **684** |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | |
|---|---|
| **Total Intersection Critical Volumes** | **2,016** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **1.466** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **1.366** |
| **Level of Service (LOS)** | **F** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 255 | | 140 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,879 | | 1,051 | 1,051 |
| | Through/Right | 1 | | | 1,051 | |
| | Right | 0 | 223 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 193 | | 106 | 106 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,344 | | 692 | |
| | Through/Right | 1 | | | 692 | |
| | Right | 0 | 41 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,157** |
| | Left | 2 | 119 | | 65 | 65 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 3 | 900 | | 300 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 248 | 140 | 108 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 294 | | 162 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 964 | | 482 | 482 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 165 | 106 | 59 | |
| | Total Lanes | 5 | | | | |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **547** |
| | | **Total Intersection Critical Volumes** | **1,704** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.239** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.139** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 2 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Pacific Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves | |
|---|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 2 | | | | North/South Opposed Phasing |
| | Left/Through | 1 | | | 72 | | |
| | Through | 0 | 70 | | | | |
| | Through/Right | 1 | | | 130 | 130 | |
| | Right | 0 | 130 | 0 | | | |
| | Total Lanes | 2 | | | | | |
| Southbound | Left | 0 | 732 | | | | |
| | Left/Through | 1 | | | 732 | 732 | |
| | Through | 0 | 120 | | | | |
| | Through/Right | 1 | | | 146 | | |
| | Right | 0 | 26 | 0 | | | |
| | Total Lanes | 2 | | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **862** | |
| Eastbound | Left | 0 | 20 | | | | WB Rt. Turn Overlap with SB Left |
| | Left/Through | 0 | | | | | |
| | Left/Through/Right | 1 | 93 | | 131 | 131 | |
| | Through/Right | 0 | | | | | |
| | Right | 0 | 18 | 0 | | | |
| | Total Lanes | 1 | | | | | |
| Westbound | Left | 1 | 179 | | 179 | 179 | |
| | Left/Through | 0 | | | | | |
| | Through | 1 | 61 | | 61 | | |
| | Through/Right | 0 | | | | | |
| | Right | 1 | 476 | 476 | 0 | | |
| | Total Lanes | 3 | | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **310** |
| | | **Total Intersection Critical Volumes** | **1,172** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.822** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.722** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 58 | | 58 | 58 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 11 | | 11 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 97 | 72 | 25 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 0 | 27 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 29 | | 70 | 70 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 14 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **128** |
| Eastbound | Left | 1 | 13 | | 13 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 790 | | 395 | 395 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 122 | 29 | 93 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 145 | | 145 | 145 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 698 | | 349 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 58 | 52 | 6 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **540** |
| | | | **Total Intersection Critical Volumes** | | | **668** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.445** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.345** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 380 | | 209 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 259 | | 259 | 259 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 295 | 128 | 167 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 35 | | 35 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 466 | | | |
| | Through/Right | 1 | | | 577 | 577 |
| | Right | 0 | 111 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **836** |
| | Left | 1 | 39 | | 39 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 620 | | 310 | 310 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 371 | 130 | 241 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 257 | | 257 | 257 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 540 | | 270 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 48 | 48 | 0 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **567** |
| | | **Total Intersection Critical Volumes** | **1,403** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.985** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.885** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 238 | 0 | 238 | 238 |
| | Total Lanes | 1 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **238** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 795 | | 398 | 398 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 211 | 119 | 92 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 543 | | 543 | 543 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 865 | | 432 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **941** |
| | | **Total Intersection Critical Volumes** | **1,179** |
| **Number of Clearance Intervals** | **0** | **Intersection Capacity** | **1,200** |
| | | **Base CMA** | **0.983** |
| **Signal Coordination** | **None** | **Signal Coordination Adjustment** | **0.000** |
| | | **Final CMA** | **0.983** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 765 | | 493 | 493 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 493 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 221 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **493** |
| Eastbound | Left | 1 | 122 | | 122 | 122 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 888 | | 444 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,152 | | 576 | 576 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 597 | 493 | 104 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **698** |
| | | | **Total Intersection Critical Volumes** | | | **1,191** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.794** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.694** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 539 | | 296 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,144 | | 819 | 819 |
| | Through/Right | 1 | | | 819 | |
| | Right | 0 | 314 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 2 | 287 | | 158 | 158 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,675 | | 613 | |
| | Through/Right | 1 | | | 613 | |
| | Right | 0 | 163 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **977** |
| Eastbound | Left | 2 | 149 | | 82 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 995 | | 498 | 498 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 570 | 296 | 274 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 2 | 341 | | 188 | 188 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 945 | | 472 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 360 | 158 | 202 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **686** |
| | | | **Total Intersection Critical Volumes** | | | **1,663** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.209** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.109** |
| | | | **Level of Service (LOS)** | | | **F** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 8 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 189 | | 188 | 188 |
| | Left/Through | 1 | | | 188 | |
| | Through | 0 | 186 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 359 | 359 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 512 | | 332 | 332 |
| | Left/Through | 1 | | | 332 | |
| | Through | 0 | 151 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 82 | 56 | 26 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **520** |
| Eastbound | Left | 1 | 56 | | 56 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,270 | | 635 | 635 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 302 | 188 | 114 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 527 | | 527 | 527 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,446 | | 579 | |
| | Through/Right | 1 | | | 579 | |
| | Right | 0 | 291 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **1,162** |
| **Total Intersection Critical Volumes** | **1,682** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **1.223** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **1.123** |
| **Level of Service (LOS)** | **F** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 11 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Maxella Avenue/Marina Pointe Drive | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 198 | | 109 | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,639 | | 880 | 880 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 303 | 186 | 117 | |
| | Total Lanes | 6 | | | | |
| Southbound | Left | 2 | 178 | | 98 | 98 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,411 | | 631 | |
| | Through/Right | 1 | | | 631 | |
| | Right | 0 | 112 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **978** |
| Eastbound | Left | 1 | 81 | | 81 | 81 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 73 | | 73 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 46 | 46 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 281 | | 186 | 186 |
| | Left/Through | 1 | | | 186 | |
| | Through | 0 | 91 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 186 | 98 | 88 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **267** |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,245** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.905** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.805** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue | | |
| | East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 158 | | 158 | 158 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 540 | | 540 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 83 | 83 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 52 | | 52 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 726 | | 464 | 464 |
| | Through/Right | 1 | | | 464 | |
| | Right | 0 | 202 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **622** |
| | Left | 1 | 194 | | 194 | 194 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 143 | | 143 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 209 | 79 | 130 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 103 | | 103 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 188 | | 128 | 128 |
| | Through/Right | 1 | | | 128 | |
| | Right | 0 | 68 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **322** |
| | | | **Total Intersection Critical Volumes** | | | **944** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.629** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.529** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 13 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Lincoln Boulevard | | |
| | East/West: | Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | PM Peak Hour | | | |
| **Analysis Scenario** | Future (2016) | Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 2,153 | | 793 | 793 |
| | Through/Right | 1 | | | 793 | |
| | Right | 0 | 226 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 923 | | 508 | 508 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,954 | | 651 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,301** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 204 | | 112 | 112 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 1,010 | 1,010 | 0 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **112** |
| | | **Total Intersection Critical Volumes** | **1,413** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.992** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.892** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 15 **Date** October 7, 2013
**Intersection Name** North/South: Lincoln Boulevard
East/West: Bali Way/Auto Dealership Driveway
**Intersection Control** Signalized
**Analysis Period** PM Peak Hour
**Analysis Scenario** Future (2016) Without Project (LADOT Only)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 159 | | 159 | 159 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,042 | | 687 | |
| | Through/Right | 1 | | | 687 | |
| | Right | 0 | 19 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 2 | | 2 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,898 | | 733 | 733 |
| | Through/Right | 1 | | | 733 | |
| | Right | 0 | 301 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **892** |
| Eastbound | Left | 1 | 380 | | 192 | 192 |
| | Left/Through | 1 | | | 192 | |
| | Through | 0 | 4 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 82 | 80 | 2 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 6 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 42 | 42 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 36 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **234** |
| **Total Intersection Critical Volumes** | **1,126** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.819** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.719** |
| **Level of Service (LOS)** | **C** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 304 | | 304 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,287 | | 762 | 762 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 455 | 332 | 123 | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 152 | | 152 | 152 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,664 | | 581 | |
| | Through/Right | 1 | | | 581 | |
| | Right | 0 | 80 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **914** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 557 | | 361 | 361 |
| | Through/Right | 1 | | | 361 | |
| | Right | 0 | 165 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 2 | 604 | | 332 | 332 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 1,139 | | 610 | |
| | Through/Right | 1 | | | 610 | |
| | Right | 0 | 80 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **693** |
| | | | **Total Intersection Critical Volumes** | | | **1,607** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.169** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.069** |
| | | | **Level of Service (LOS)** | | | **F** |

*NB Rt. Turn Overlap with WB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 31 | | 31 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,089 | | 550 | 550 |
| | Through/Right | 1 | | | 550 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **550** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 475 | | 380 | |
| | Through/Right | 1 | | | 380 | |
| | Right | 1 | 665 | 0 | 380 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 527 | | 290 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,792 | | 896 | 896 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **896** |
| | | **Total Intersection Critical Volumes** | **1,446** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **1.015** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.915** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 527 | | 527 | |
| | Left/Through | 1 | | | 582 | |
| | Through | 1 | 1,163 | | 582 | 582 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 412 | 204 | 208 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **582** |
| Eastbound | Left | 1 | 14 | | 14 | 14 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 458 | | 229 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,832 | | 622 | 622 |
| | Through/Right | 1 | | | 622 | |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **636** |
| | | | **Total Intersection Critical Volumes** | | | **1,218** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.855** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.755** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 91 | | 91 | 91 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 206 | | 114 | |
| | Through/Right | 1 | | | 114 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 137 | | 137 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 205 | | 205 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 1,202 | 202 | 1,000 | 1,000 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,091** |
| Eastbound | Left | 1 | 403 | | 403 | 403 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 439 | | 248 | |
| | Through/Right | 1 | | | 248 | |
| | Right | 0 | 56 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 8 | | 8 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 478 | | 294 | 294 |
| | Through/Right | 1 | | | 294 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **697** |
| | | **Total Intersection Critical Volumes** | **1,788** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **1.192** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.092** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 734 | | 404 | 404 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 2,794 | | 938 | |
| | Through/Right | 1 | | | 938 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 26 | | 26 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 2,252 | | 809 | 809 |
| | Through/Right | 1 | | | 809 | |
| | Right | 0 | 174 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,213** |
| | Left | 1 | 217 | | 217 | 217 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 16 | | 16 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 833 | 833 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 35 | | | |
| | Left/Through | 1 | | | 47 | |
| Westbound | Through | 0 | 20 | | | |
| | Through/Right | 1 | | | 47 | 47 |
| | Right | 0 | 39 | 0 | | |
| | Total Lanes | 2 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **264** |
| | | **Total Intersection Critical Volumes** | **1,477** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.074** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.974** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) EB On/Off-Ramps | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 129 | | 129 | 129 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 56 | |
| | Right | 0 | 56 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **129** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 645 | | 215 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 206 | 36 | 85 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 259 | | 259 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,732 | | 866 | 866 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **866** |
| | | **Total Intersection Critical Volumes** | **995** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.663** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.563** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp<br>East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 541 | | 270 | 270 |
| | Left/Through | 1 | | | 270 | |
| | Through | 0 | 238 | | | |
| | Through/Right | 1 | | | 284 | |
| | Right | 0 | 46 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 145 | | 145 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 425 | 97 | 328 | 328 |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **598** |
| Eastbound | Left | 1 | 194 | | 194 | 194 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 597 | | 298 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,039 | | 520 | 520 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 344 | 157 | 187 | |
| | Total Lanes | 3 | | | | |

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **714** |
| **Total Intersection Critical Volumes** | **1,312** |
| **Intersection Capacity** | **1,425** |
| **Base CMA** | **0.921** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.821** |
| **Level of Service (LOS)** | **D** |

**Number of Clearance Intervals** **3**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) Without Project (LADOT Only) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 29 | | 29 | |
| | Left/Through | 0 | | | | |
| | Through | 4 | 2,349 | | 587 | 587 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 638 | 214 | 424 | |
| | Total Lanes | 6 | | | | |
| Southbound | Left | 2 | 679 | | 373 | 373 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,992 | | 607 | |
| | Through/Right | 1 | | | 607 | |
| | Right | 0 | 436 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **960** |
| Eastbound | Left | 1 | 43 | | 43 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 165 | | 74 | 74 |
| | Through/Right | 1 | | | 74 | |
| | Right | 0 | 58 | 0 | | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 2 | 1,150 | | 632 | 632 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 304 | | 152 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 1,175 | 746 | 214 | |
| | Total Lanes | 6 | | | | |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **706** |
| **Total Intersection Critical Volumes** | **1,666** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **1.212** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **1.112** |
| **Level of Service (LOS)** | **F** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

**Future (2016) With Project**

**(Includes Cumulative Development Traffic)**

**(County and City of Los Angeles Intersections)**

# AM Peak Hour

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 238 | | 131 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,914 | | 1,041 | 1,041 |
| | Through/Right | 1 | | | 1,041 | |
| | Right | 0 | 168 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 2 | 193 | | 106 | 106 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,503 | | 776 | |
| | Through/Right | 1 | | | 776 | |
| | Right | 0 | 49 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,147** |
| Eastbound | Left | 2 | 143 | | 79 | 79 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 859 | | 286 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 210 | 131 | 79 | |
| | Total Lanes | 6 | | | | |
| Westbound | Left | 2 | 408 | | 224 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,016 | | 508 | 508 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 247 | 106 | 141 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **587** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,734** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.261** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.161** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 2 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Pacific Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 137 | |
| | Through | 0 | 135 | | | |
| | Through/Right | 1 | | | 195 | 195 |
| | Right | 0 | 195 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 0 | 400 | | | |
| | Left/Through | 1 | | | 400 | 400 |
| | Through | 0 | 69 | | | |
| | Through/Right | 1 | | | 86 | |
| | Right | 0 | 17 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **595** |
| Eastbound | Left | 0 | 19 | | | 19 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 61 | | 93 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| Westbound | Left | 1 | 109 | | 109 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 65 | | 65 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 738 | 400 | 338 | 338 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **357** |
| | | | **Total Intersection Critical Volumes** | | | **952** |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.668** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.568** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 150 | | 150 | 150 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 39 | | 39 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 199 | 49 | 150 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 10 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Left/Through/Right | 1 | 5 | | 28 | 28 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **178** |
| | Left | 1 | 12 | | 12 | 12 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 613 | | 306 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 49 | 49 | 0 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 71 | | 71 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 783 | | 392 | 392 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 54 | 14 | 40 | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **404** |
| | | **Total Intersection Critical Volumes** | **582** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.388** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.288** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 477 | | 262 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 352 | | 352 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 511 | 79 | 432 | 432 |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 19 | | 19 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 135 | | | |
| | Through/Right | 1 | | | 204 | 204 |
| | Right | 0 | 69 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **636** |
| Eastbound | Left | 1 | 44 | | 44 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 623 | | 312 | 312 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 202 | 202 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 159 | | 159 | 159 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 402 | | 201 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 43 | 43 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **471** |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,107** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.777** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.677** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 351 | 0 | 351 | 351 |
| | Total Lanes | 1 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **351** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,062 | | 531 | 531 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 96 | 96 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 215 | | 215 | 215 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 627 | | 314 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **746** |
| | | | **Total Intersection Critical Volumes** | | | **1,097** |
| **Number of Clearance Intervals** | **0** | | **Intersection Capacity** | | | **1,200** |
| | | | **Base CMA** | | | **0.914** |
| **Signal Coordination** | **None** | | **Signal Coordination Adjustment** | | | **0.000** |
| | | | **Final CMA** | | | **0.914** |
| | | | **Level of Service (LOS)** | | | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 435 | | 282 | 282 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 282 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 130 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **282** |
| Eastbound | Left | 1 | 177 | | 177 | 177 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,288 | | 644 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 700 | | 350 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 849 | 282 | 567 | 567 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **744** |
| | | | **Total Intersection Critical Volumes** | | | **1,026** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.684** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.584** |
| | | | **Level of Service (LOS)** | | | **A** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 537 | | 295 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 2,075 | | 767 | 767 |
| | Through/Right | 1 | | | 767 | |
| | Right | 0 | 227 | 0 | | |
| | Total Lanes | 5 | | | | |
| | Left | 2 | 339 | | 186 | 186 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,587 | | 584 | |
| | Through/Right | 1 | | | 584 | |
| | Right | 0 | 164 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **953** |
| | Left | 2 | 208 | | 114 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 878 | | 439 | 439 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 604 | 295 | 309 | |
| | Total Lanes | 5 | | | | |
| | Left | 2 | 163 | | 90 | 90 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 714 | | 357 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 245 | 186 | 59 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **529** |
| | | | **Total Intersection Critical Volumes** | | | **1,482** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.078** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.978** |
| | | | **Level of Service (LOS)** | | | **E** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 8 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 260 | | 162 | 162 |
| | Left/Through | 1 | | | 162 | |
| | Through | 0 | 64 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 351 | 286 | 65 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 103 | | 72 | 72 |
| | Left/Through | 1 | | | 72 | |
| | Through | 0 | 42 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 23 | 22 | 1 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **234** |
| Eastbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,219 | | 610 | 610 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 134 | 134 | 0 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 286 | | 286 | 286 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 805 | | 324 | |
| | Through/Right | 1 | | | 324 | |
| | Right | 0 | 167 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **896** |
| | | | **Total Intersection Critical Volumes** | | | **1,130** |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.822** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.722** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 695 | | 348 | 348 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 1,010 | 1,010 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 285 | | 285 | 285 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 215 | | 72 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **633** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 442 | | 243 | 243 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 681 | 570 | 56 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **243** |
| | | | **Total Intersection Critical Volumes** | | | **876** |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.615** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.515** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

**Project Name** Marina del Rey - Parcel 44 Project
**Intersection Number** 10 **Date** October 7, 2013
**Intersection Name** North/South: Palawan Way
East/West: Admiralty Way
**Intersection Control** Signalized
**Analysis Period** AM Peak Hour
**Analysis Scenario** Future (2016) With Project (Includes Cumulative Development)

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 55 | | | |
| | Left/Through | 1 | | | 154 | |
| | Through | 0 | 159 | | | |
| | Through/Right | 1 | | | 154 | 154 |
| | Right | 0 | 93 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 176 | | 176 | 176 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 73 | | 73 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 98 | 81 | 17 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **330** |
| Eastbound | Left | 1 | 93 | | 93 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,152 | | 582 | 582 |
| | Through/Right | 1 | | | 582 | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 78 | | 78 | 78 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 997 | | 498 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 110 | 36 | 74 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **660** |
| | | | **Total Intersection Critical Volumes** | | | **990** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.695** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.595** |
| | | | **Level of Service (LOS)** | | | **A** |

*North/South Opposed Phasing*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 11 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Maxella Avenue/Marina Pointe Drive | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 57 | | 31 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,632 | | 877 | 877 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 225 | 124 | 101 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 131 | | 72 | 72 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 2,239 | | 574 | |
| | Through/Right | 1 | | | 574 | |
| | Right | 0 | 57 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **949** |
| | Left | 1 | 64 | | 64 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 80 | | 80 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 131 | 31 | 100 | 100 |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 218 | | 124 | 124 |
| | Left/Through | 1 | | | 124 | |
| Westbound | Through | 0 | 30 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 148 | 72 | 76 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **224** |

*NB Rt. Turn Overlap with WB Left*

*East/West Opposed Phasing*
*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,173** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.853** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.753** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue | | |
| | East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 86 | | 86 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 465 | | 465 | 465 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 61 | 58 | 3 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 22 | | 22 | 22 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 374 | | 226 | |
| | Through/Right | 1 | | | 226 | |
| | Right | 0 | 78 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **487** |
| | Left | 1 | 116 | | 116 | 116 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 82 | | 82 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 154 | 130 | 24 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 83 | | 83 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 90 | | 81 | 81 |
| | Through/Right | 1 | | | 81 | |
| | Right | 0 | 72 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **197** |
| | | **Total Intersection Critical Volumes** | **684** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.456** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.356** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 13 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Marina Expressway (SR-90) | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 1,877 | | 724 | 724 |
| | Through/Right | 1 | | | 724 | |
| | Right | 0 | 294 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 924 | | 508 | 508 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 1,703 | | 568 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,232** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 2 | 151 | | 83 | 83 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 983 | 983 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **83** |
| | | | **Total Intersection Critical Volumes** | | | **1,315** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.923** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.823** |
| | | | **Level of Service (LOS)** | | | **D** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | | |
|---|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | | |
| **Intersection Number** | 14 | | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: | Admiralty Way | | |
| | East/West: | Bali Way | | |
| **Intersection Control** | Signalized | | | |
| **Analysis Period** | AM Peak Hour | | | |
| **Analysis Scenario** | Future (2016) | With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 7 | | 7 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,192 | | 684 | 684 |
| | Through/Right | 1 | | | 684 | |
| | Right | 0 | 176 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 334 | | 184 | 184 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,623 | | 815 | |
| | Through/Right | 1 | | | 815 | |
| | Right | 0 | 7 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **868** |
| | Left | 0 | 12 | | | 12 |
| | Left/Through | 1 | | | 14 | |
| Eastbound | Through | 0 | 9 | | | |
| | Through/Right | 1 | | | 14 | |
| | Right | 0 | 6 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 1 | 16 | | 16 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 30 | | | |
| | Through/Right | 1 | | | 77 | |
| | Right | 1 | 308 | 184 | 77 | 77 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **89** |
| | | | **Total Intersection Critical Volumes** | | | **957** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.696** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.596** |
| | | | **Level of Service (LOS)** | | | **A** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 115 | | 115 | 115 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,800 | | 607 | |
| | Through/Right | 1 | | | 607 | |
| | Right | 0 | 20 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 3 | | 3 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,631 | | 614 | 614 |
| | Through/Right | 1 | | | 614 | |
| | Right | 0 | 212 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **729** |
| Eastbound | Left | 1 | 341 | | 172 | 172 |
| | Left/Through | 1 | | | 172 | |
| | Through | 0 | 2 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 153 | 58 | 95 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 2 | | 10 | 10 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 8 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **182** |
| | | **Total Intersection Critical Volumes** | **911** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.663** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.563** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 32 | | 32 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 939 | | 547 | 547 |
| | Through/Right | 1 | | | 547 | |
| | Right | 0 | 155 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 424 | | 233 | 233 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,129 | | 580 | |
| | Through/Right | 1 | | | 580 | |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **780** |
| Eastbound | Left | 1 | 54 | | 44 | |
| | Left/Through | 1 | | | 44 | |
| | Through | 0 | 38 | | | |
| | Through/Right | 1 | | | 44 | 44 |
| | Right | 0 | 39 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 162 | | 121 | |
| | Left/Through | 1 | | | 121 | |
| | Through | 0 | 80 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 447 | 233 | 214 | 214 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **258** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,038** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.755** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.655** |
| | | **Level of Service (LOS)** | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 217 | | 217 | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,918 | | 973 | 973 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 499 | 168 | 331 | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 186 | | 186 | 186 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,847 | | 639 | |
| | Through/Right | 1 | | | 639 | |
| | Right | 0 | 71 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,159** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 385 | | 206 | 206 |
| | Through/Right | 1 | | | 206 | |
| | Right | 0 | 26 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 2 | 305 | | 168 | 168 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 508 | | 296 | |
| | Through/Right | 1 | | | 296 | |
| | Right | 0 | 83 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **374** |
| | | | **Total Intersection Critical Volumes** | | | **1,533** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.115** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.015** |
| | | | **Level of Service (LOS)** | | | **F** |

*NB Rt. Turn Overlap with WB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90)<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 22 | | 22 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,171 | | 593 | 593 |
| | Through/Right | 1 | | | 593 | |
| | Right | 0 | 15 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **593** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 414 | | 367 | 367 |
| | Through/Right | 1 | | | 367 | |
| | Right | 1 | 687 | 0 | 367 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 378 | | 208 | 208 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 957 | | 478 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **575** |
| | | **Total Intersection Critical Volumes** | **1,168** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.820** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.720** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 447 | | 447 | |
| | Left/Through | 1 | | | 516 | |
| Northbound | Through | 1 | 1,031 | | 516 | 516 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 391 | 42 | 349 | |
| | Total Lanes | 4 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **516** |
| | Left | 1 | 4 | | 4 | 4 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 429 | | 214 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 863 | | 293 | 293 |
| | Through/Right | 1 | | | 293 | |
| | Right | 0 | 16 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **297** |
| | | **Total Intersection Critical Volumes** | **813** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.571** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.471** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 43 | | 43 | 43 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 171 | | 94 | |
| | Through/Right | 1 | | | 94 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 63 | | 63 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 137 | | 137 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 395 | 194 | 201 | 201 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **244** |
| | Left | 1 | 387 | | 387 | 387 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 338 | | 210 | |
| | Through/Right | 1 | | | 210 | |
| | Right | 0 | 82 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 14 | | 14 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 416 | | 244 | 244 |
| | Through/Right | 1 | | | 244 | |
| | Right | 0 | 72 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **631** |
| | | **Total Intersection Critical Volumes** | **875** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.583** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.483** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 748 | | 411 | 411 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 78 | 78 | 0 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **411** |
| Eastbound | Left | 1 | 90 | | 90 | 90 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 161 | | 80 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 174 | | 174 | 174 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 727 | 727 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **264** |
| | | | **Total Intersection Critical Volumes** | | | **675** |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.450** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.350** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 721 | | 397 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 3,383 | | 1,141 | 1,141 |
| | Through/Right | 1 | | | 1,141 | |
| | Right | 0 | 39 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 1 | 39 | | 39 | 39 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,076 | | 720 | |
| | Through/Right | 1 | | | 720 | |
| | Right | 0 | 85 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,180** |
| Eastbound | Left | 1 | 219 | | 219 | 219 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 21 | | 21 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 707 | 707 | 0 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 11 | | | |
| | Left/Through | 1 | | | 11 | 11 |
| | Through | 0 | 2 | | | |
| | Through/Right | 1 | | | 2 | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 2 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **230** |
| | | **Total Intersection Critical Volumes** | **1,410** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.025** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.925** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) EB On/Off-Ramps | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 63 | | 63 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 118 | 118 |
| | Right | 0 | 118 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **118** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,876 | | 625 | 625 |
| | Through/Right | 0 | | | | |
| | Right | 2 | 855 | 0 | 428 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 129 | | 129 | 129 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 504 | | 252 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **754** |
| | | **Total Intersection Critical Volumes** | **872** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.581** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.481** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp<br>East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 146 | | 146 | |
| | Left/Through | 1 | | | 199 | |
| | Through | 0 | 276 | | | |
| | Through/Right | 1 | | | 199 | 199 |
| | Right | 0 | 122 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 114 | | 114 | 114 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 160 | 160 | 0 | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **313** |
| Eastbound | Left | 1 | 518 | | 518 | 518 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,542 | | 771 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 349 | | 174 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 353 | 57 | 296 | 296 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **814** |
| | | | **Total Intersection Critical Volumes** | | | **1,127** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.791** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.691** |
| | | | **Level of Service (LOS)** | | | **B** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 20 | | 20 | |
| | Left/Through | 0 | | | | |
| | Through | 4 | 2,968 | | 742 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 925 | 82 | 843 | 843 |
| | Total Lanes | 6 | | | | |
| Southbound | Left | 2 | 892 | | 491 | 491 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 1,648 | | 482 | |
| | Through/Right | 1 | | | 482 | |
| | Right | 0 | 282 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,334** |
| Eastbound | Left | 1 | 259 | | 259 | 259 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 406 | | 146 | |
| | Through/Right | 1 | | | 146 | |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 2 | 772 | | 425 | 425 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 164 | | 82 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 930 | 930 | 0 | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **684** |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **2,018** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.468** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.368** |
| | | **Level of Service (LOS)** | **F** |

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 1 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Venice Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 255 | | 140 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 1,889 | | 1,066 | 1,066 |
| | Through/Right | 1 | | | 1,066 | |
| | Right | 0 | 242 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 193 | | 106 | 106 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,354 | | 698 | |
| | Through/Right | 1 | | | 698 | |
| | Right | 0 | 41 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,172** |
| | Left | 2 | 119 | | 65 | 65 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 3 | 900 | | 300 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 248 | 140 | 108 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 315 | | 173 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 964 | | 482 | 482 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 165 | 106 | 59 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **547** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,719** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.250** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.150** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 2 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Pacific Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 2 | | | |
| | Left/Through | 1 | | | 72 | |
| Northbound | Through | 0 | 70 | | | |
| | Through/Right | 1 | | | 130 | 130 |
| | Right | 0 | 130 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 0 | 742 | | | |
| | Left/Through | 1 | | | 742 | 742 |
| Southbound | Through | 0 | 120 | | | |
| | Through/Right | 1 | | | 146 | |
| | Right | 0 | 26 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **872** |
| | Left | 0 | 20 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Left/Through/Right | 1 | 93 | | 131 | 131 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 1 | | | | |
| | Left | 1 | 179 | | 179 | 179 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 61 | | 61 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 486 | 486 | 0 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **310** |

*North/South Opposed Phasing*

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,182** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.829** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.729** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 3 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Dolce/Dell Avenue | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 58 | | 58 | 58 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 11 | | 11 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 97 | 72 | 25 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 31 | | | |
| | Left/Through | 0 | | | | |
| Southbound | Left/Through/Right | 1 | 29 | | 74 | 74 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 14 | 0 | | |
| | Total Lanes | 1 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **132** |
| | Left | 1 | 13 | | 13 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 800 | | 400 | 400 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 122 | 29 | 93 | |
| | Total Lanes | 4 | | | | |
| | Left | 1 | 145 | | 145 | 145 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 708 | | 354 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 61 | 54 | 7 | |
| | Total Lanes | 4 | | | | |

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **545** |
| **Total Intersection Critical Volumes** | **677** |
| **Intersection Capacity** | **1,500** |
| **Base CMA** | **0.451** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.351** |
| **Level of Service (LOS)** | **A** |

**Number of Clearance Intervals** **2**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 4 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina/Ocean Avenue<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 393 | | 216 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 264 | | 264 | 264 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 295 | 128 | 167 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 38 | | 38 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 470 | | | |
| | Through/Right | 1 | | | 581 | 581 |
| | Right | 0 | 111 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **845** |
| Eastbound | Left | 1 | 39 | | 39 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 627 | | 314 | 314 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 378 | 132 | 246 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 257 | | 257 | 257 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 540 | | 270 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 48 | 48 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **571** |
| | | | **Total Intersection Critical Volumes** | | | **1,416** |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.994** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.894** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 5 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Washington Boulevard | | |
| **Intersection Control** | Two-Way STOP | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 238 | 0 | 238 | 238 |
| | Total Lanes | 1 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **238** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 795 | | 398 | 398 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 221 | 119 | 102 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 543 | | 543 | 543 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 865 | | 432 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **941** |
| | | | **Total Intersection Critical Volumes** | | | **1,179** |
| **Number of Clearance Intervals** | | **0** | **Intersection Capacity** | | | **1,200** |
| | | | **Base CMA** | | | **0.983** |
| **Signal Coordination** | **None** | | **Signal Coordination Adjustment** | | | **0.000** |
| | | | **Final CMA** | | | **0.983** |
| | | | **Level of Service (LOS)** | | | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 6 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Abbot Kinney Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 775 | | 498 | 498 |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 498 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 221 | 0 | | |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **498** |
| Eastbound | Left | 1 | 122 | | 122 | 122 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 888 | | 444 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,152 | | 576 | 576 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 606 | 498 | 108 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **698** |
| | | | **Total Intersection Critical Volumes** | | | **1,196** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.797** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.697** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 7 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 2 | 548 | | 301 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,173 | | 833 | 833 |
| | Through/Right | 1 | | | 833 | |
| | Right | 0 | 327 | 0 | | |
| | Total Lanes | 5 | | | | |
| Southbound | Left | 2 | 287 | | 158 | 158 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,706 | | 623 | |
| | Through/Right | 1 | | | 623 | |
| | Right | 0 | 163 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **991** |
| Eastbound | Left | 2 | 149 | | 82 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 995 | | 498 | 498 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 580 | 301 | 279 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 2 | 358 | | 197 | 197 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 945 | | 472 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 360 | 158 | 202 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **695** |

*EB/WB Rt. Turn Overlap With NB/SB Lefts*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,686** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.226** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.126** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 8 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue/Costco Plaza Driveway<br>East/West: Washington Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 189 | | 188 | 188 |
| | Left/Through | 1 | | | 188 | |
| | Through | 0 | 186 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 362 | 362 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 512 | | 332 | 332 |
| | Left/Through | 1 | | | 332 | |
| | Through | 0 | 151 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 82 | 56 | 26 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **520** |
| Eastbound | Left | 1 | 56 | | 56 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,283 | | 642 | 642 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 302 | 188 | 114 | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 1 | 531 | | 531 | 531 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,463 | | 585 | |
| | Through/Right | 1 | | | 585 | |
| | Right | 0 | 291 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*
*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*EB Rt. Turn Overlap with NB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **1,173** |
| | | **Total Intersection Critical Volumes** | **1,693** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.231** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.131** |
| | | **Level of Service (LOS)** | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 489 | | 244 | 244 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 662 | 662 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 659 | | 659 | 659 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 467 | | 156 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **903** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 1,254 | | 690 | 690 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 538 | 538 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **690** |
| | | | **Total Intersection Critical Volumes** | | | **1,593** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **1.118** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.018** |
| | | | **Level of Service (LOS)** | | | **F** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 36 | | | |
| | Left/Through | 1 | | | 106 | |
| | Through | 0 | 105 | | | |
| | Through/Right | 1 | | | 106 | 106 |
| | Right | 0 | 71 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 419 | | 419 | 419 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 153 | | 153 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 175 | 26 | 149 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **525** |
| Eastbound | Left | 1 | 52 | | 52 | 52 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,305 | | 661 | |
| | Through/Right | 1 | | | 661 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 126 | | 126 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,544 | | 772 | 772 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 108 | 76 | 32 | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **824** |
| | | **Total Intersection Critical Volumes** | **1,349** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.947** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.847** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 11 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Maxella Avenue/Marina Pointe Drive | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves | |
|---|---|---|---|---|---|---|---|
| | Left | 2 | 198 | | 109 | | NB Rt. Turn Overlap with WB Left |
| | Left/Through | 0 | | | | | |
| Northbound | Through | 3 | 2,690 | | 897 | 897 | |
| | Through/Right | 0 | | | | | |
| | Right | 1 | 303 | 186 | 117 | | |
| | Total Lanes | 6 | | | | | |
| | Left | 2 | 178 | | 98 | 98 | |
| | Left/Through | 0 | | | | | |
| Southbound | Through | 3 | 2,469 | | 645 | | |
| | Through/Right | 1 | | | 645 | | |
| | Right | 0 | 112 | 0 | | | |
| | Total Lanes | 6 | | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **995** | |
| | Left | 1 | 81 | | 81 | 81 | East/West Opposed Phasing<br>EB/WB Rt. Turn Overlap With NB/SB Lefts |
| | Left/Through | 0 | | | | | |
| Eastbound | Through | 1 | 73 | | 73 | | |
| | Through/Right | 0 | | | | | |
| | Right | 1 | 46 | 46 | 0 | | |
| | Total Lanes | 3 | | | | | |
| | Left | 1 | 281 | | 186 | 186 | |
| | Left/Through | 1 | | | 186 | | |
| Westbound | Through | 0 | 91 | | | | |
| | Through/Right | 0 | | | | | |
| | Right | 1 | 186 | 98 | 88 | | |
| | Total Lanes | 3 | | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **267** |
| | | **Total Intersection Critical Volumes** | **1,262** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.918** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.818** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 12 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue<br>East/West: Maxella Avenue | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 158 | | 158 | 158 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 543 | | 543 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 83 | 83 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 52 | | 52 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 730 | | 466 | 466 |
| | Through/Right | 1 | | | 466 | |
| | Right | 0 | 202 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **624** |
| | Left | 1 | 194 | | 194 | 194 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 143 | | 143 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 209 | 79 | 130 | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 103 | | 103 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 188 | | 128 | 128 |
| | Through/Right | 1 | | | 128 | |
| | Right | 0 | 68 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **322** |
| | | | **Total Intersection Critical Volumes** | | | **946** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.631** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.531** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | |
|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | |
| **Intersection Number** | 13 | **Date** October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Marina Expressway (SR-90) | |
| **Intersection Control** | Signalized | |
| **Analysis Period** | PM Peak Hour | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,204 | | 810 | 810 |
| | Through/Right | 1 | | | 810 | |
| | Right | 0 | 226 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 923 | | 508 | 508 |
| | Left/Through | 0 | | | | |
| | Through | 3 | 2,012 | | 671 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,318** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 2 | 204 | | 112 | 112 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 1,010 | 1,010 | 0 | |
| | Total Lanes | 4 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **112** |
| | | **Total Intersection Critical Volumes** | **1,430** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **1.004** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.904** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 14 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Bali Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 9 | | 9 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,606 | | 906 | 906 |
| | Through/Right | 1 | | | 906 | |
| | Right | 0 | 205 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 274 | | 151 | 151 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,634 | | 822 | |
| | Through/Right | 1 | | | 822 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,057** |
| Eastbound | Left | 0 | 24 | | | 24 |
| | Left/Through | 1 | | | 28 | |
| | Through | 0 | 33 | | | |
| | Through/Right | 1 | | | 39 | |
| | Right | 0 | 10 | 0 | | |
| | Total Lanes | 2 | | | | |
| Westbound | Left | 1 | 49 | | 49 | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 19 | | | |
| | Through/Right | 1 | | | 144 | |
| | Right | 1 | 421 | 151 | 144 | 144 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **168** |
| | | | **Total Intersection Critical Volumes** | | | **1,225** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **0.891** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.791** |
| | | | **Level of Service (LOS)** | | | **C** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 15 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Bali Way/Auto Dealership Driveway | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 161 | | 161 | 161 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 2,042 | | 687 | |
| | Through/Right | 1 | | | 687 | |
| | Right | 0 | 19 | 0 | | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 1 | 2 | | 2 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,923 | | 752 | 752 |
| | Through/Right | 1 | | | 752 | |
| | Right | 0 | 334 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **913** |
| Eastbound | Left | 1 | 431 | | 218 | 218 |
| | Left/Through | 1 | | | 218 | |
| | Through | 0 | 4 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 86 | 80 | 6 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 6 | | | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 0 | | 42 | 42 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 36 | 0 | | |
| | Total Lanes | 1 | | | | |

*East/West Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **260** |
| | | **Total Intersection Critical Volumes** | **1,173** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.853** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.753** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 34 | | 34 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 925 | | 568 | 568 |
| | Through/Right | 1 | | | 568 | |
| | Right | 0 | 211 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 472 | | 260 | 260 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,094 | | 574 | |
| | Through/Right | 1 | | | 574 | |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **828** |
| | Left | 1 | 184 | | 129 | |
| | Left/Through | 1 | | | 129 | |
| Eastbound | Through | 0 | 149 | | | |
| | Through/Right | 1 | | | 129 | 129 |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 437 | | 301 | |
| | Left/Through | 1 | | | 301 | |
| Westbound | Through | 0 | 165 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 668 | 260 | 408 | 408 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **537** |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,365** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.993** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.893** |
| | | **Level of Service (LOS)** | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 17 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 342 | | 342 | 342 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 3 | 2,288 | | 763 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 455 | 332 | 123 | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 154 | | 154 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 1,666 | | 590 | 590 |
| | Through/Right | 1 | | | 590 | |
| | Right | 0 | 105 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **932** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 606 | | 398 | 398 |
| | Through/Right | 1 | | | 398 | |
| | Right | 0 | 190 | 0 | | |
| | Total Lanes | 2 | | | | |
| | Left | 2 | 604 | | 332 | 332 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 1 | 1,189 | | 635 | |
| | Through/Right | 1 | | | 635 | |
| | Right | 0 | 81 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **730** |
| | | | **Total Intersection Critical Volumes** | | | **1,662** |
| **Number of Clearance Intervals** | **4** | | **Intersection Capacity** | | | **1,375** |
| | | | **Base CMA** | | | **1.209** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.109** |
| | | | **Level of Service (LOS)** | | | **F** |

*NB Rt. Turn Overlap with WB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 18 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: EB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 31 | | 31 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,089 | | 550 | 550 |
| | Through/Right | 1 | | | 550 | |
| | Right | 0 | 11 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **550** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 488 | | 397 | |
| | Through/Right | 1 | | | 397 | |
| | Right | 1 | 703 | 0 | 397 | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 2 | 527 | | 290 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,843 | | 922 | 922 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **922** |
| | | **Total Intersection Critical Volumes** | **1,472** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **1.033** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.933** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 19 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: WB Marina Expressway (SR-90) | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 563 | | 563 | |
| | Left/Through | 1 | | | 582 | |
| | Through | 1 | 1,163 | | 582 | 582 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 412 | 202 | 210 | |
| | Total Lanes | 4 | | | | |
| Southbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **582** |
| Eastbound | Left | 1 | 14 | | 14 | 14 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 471 | | 236 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,847 | | 627 | 627 |
| | Through/Right | 1 | | | 627 | |
| | Right | 0 | 33 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **641** |
| | | | **Total Intersection Critical Volumes** | | | **1,223** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.858** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.758** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 20 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Glencoe Avenue | | |
| | East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 91 | | 91 | 91 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 206 | | 114 | |
| | Through/Right | 1 | | | 114 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 1 | 137 | | 137 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 205 | | 205 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 1,206 | 203 | 1,003 | 1,003 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,094** |
| Eastbound | Left | 1 | 406 | | 406 | 406 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 449 | | 252 | |
| | Through/Right | 1 | | | 252 | |
| | Right | 0 | 56 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 8 | | 8 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 489 | | 300 | 300 |
| | Through/Right | 1 | | | 300 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **706** |
| | | | **Total Intersection Critical Volumes** | | | **1,800** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **1.200** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **1.100** |
| | | | **Level of Service (LOS)** | | | **F** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 21 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 730 | | 402 | 402 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 153 | 153 | 0 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **402** |
| Eastbound | Left | 1 | 158 | | 158 | 158 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 381 | | 190 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 299 | | 299 | 299 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 697 | 697 | 0 | |
| | Total Lanes | 2 | | | | |

*SB Rt. Turn Overlap with EB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **457** |
| | | **Total Intersection Critical Volumes** | **859** |
| **Number of Clearance Intervals** | **2** | **Intersection Capacity** | **1,500** |
| | | **Base CMA** | **0.573** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.473** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 22 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard | | |
| | East/West: Fiji Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 2 | 751 | | 413 | 413 |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 2,833 | | 951 | |
| | Through/Right | 1 | | | 951 | |
| | Right | 0 | 21 | 0 | | |
| | Total Lanes | 5 | | | | |
| | Left | 1 | 26 | | 26 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 2,279 | | 818 | 818 |
| | Through/Right | 1 | | | 818 | |
| | Right | 0 | 174 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **1,231** |
| | Left | 1 | 217 | | 217 | 217 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 1 | 16 | | 16 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 848 | 848 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 35 | | | |
| | Left/Through | 1 | | | 47 | |
| Westbound | Through | 0 | 20 | | | |
| | Through/Right | 1 | | | 47 | 47 |
| | Right | 0 | 39 | 0 | | |
| | Total Lanes | 2 | | | | |

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **264** |
| | | **Total Intersection Critical Volumes** | **1,495** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.087** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.987** |
| | | **Level of Service (LOS)** | **E** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 23 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) EB On/Off-Ramps | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 1 | 138 | | 138 | 138 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 0 | | 0 | |
| | Through/Right | 1 | | | 56 | |
| | Right | 0 | 56 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **138** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 3 | 645 | | 215 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 206 | 41 | 82 | |
| | Total Lanes | 5 | | | | |
| Westbound | Left | 1 | 259 | | 259 | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,736 | | 868 | 868 |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **868** |
| | | | **Total Intersection Critical Volumes** | | | **1,006** |
| **Number of Clearance Intervals** | **2** | | **Intersection Capacity** | | | **1,500** |
| | | | **Base CMA** | | | **0.671** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.571** |
| | | | **Level of Service (LOS)** | | | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 24 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Marina Freeway (SR-90) WB Off-Ramp | | |
| | East/West: Culver Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 541 | | 270 | 270 |
| | Left/Through | 1 | | | 270 | |
| Northbound | Through | 0 | 238 | | | |
| | Through/Right | 1 | | | 284 | |
| | Right | 0 | 46 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 145 | | 145 | |
| | Left/Through | 0 | | | | |
| Southbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 425 | 97 | 328 | 328 |
| | Total Lanes | 2 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **598** |
| | Left | 1 | 194 | | 194 | 194 |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 606 | | 303 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 1,043 | | 522 | 522 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 350 | 157 | 193 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **716** |
| | | | **Total Intersection Critical Volumes** | | | **1,314** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.922** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.822** |
| | | | **Level of Service (LOS)** | | | **D** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 25 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Lincoln Boulevard<br>East/West: Jefferson Boulevard | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Project (Includes Cumulative Development) | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 29 | | 29 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 4 | 2,371 | | 593 | 593 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 638 | 214 | 424 | |
| | Total Lanes | 6 | | | | |
| | Left | 2 | 696 | | 383 | 383 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 3 | 2,009 | | 613 | |
| | Through/Right | 1 | | | 613 | |
| | Right | 0 | 444 | 0 | | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **976** |
| | Left | 1 | 43 | | 43 | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 2 | 165 | | 74 | 74 |
| | Through/Right | 1 | | | 74 | |
| | Right | 0 | 58 | 0 | | |
| | Total Lanes | 4 | | | | |
| | Left | 2 | 1,150 | | 632 | 632 |
| | Left/Through | 0 | | | | |
| Westbound | Through | 2 | 304 | | 152 | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 1,195 | 766 | 214 | |
| | Total Lanes | 6 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **706** |

*NB/SB Rt. Turn Overlap With WB/EB Lefts*

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Total Intersection Critical Volumes** | **1,682** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **1.223** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **1.123** |
| | | **Level of Service (LOS)** | **F** |

**Future (2016) With Project Plus Project-Specific Mitigation**

**(Includes Cumulative Development Traffic)**

**(City of Los Angeles Intersections Only)**

***No Feasible Mitigation For:***

***Intersection No. 1, Lincoln Boulevard and Venice Boulevard,***

***Intersection No. 7, Lincoln Boulevard and Washington Boulevard,***

***Intersection No. 13, Lincoln Boulevard and Marina Expressway,***

***Intersection No. 17, Lincoln Boulevard and Mindanao Way,***

***Intersection No. 18, Lincoln Boulevard and Fiji Way,***

***Intersection No. 22, Mindanao Way and Eastbound Marina Expressway,***

***or***

***Intersection No. 25, Lincoln Boulevard and Jefferson Boulevard***

## Future (2016) With Cumulative Development Plus Cumulative Mitigation
## (Los Angeles County Intersections Only)

AM Peak Hour

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP A | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 2 | 695 | | 348 | 348 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 1,010 | 1,010 | 0 | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 285 | | 157 | 157 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 2 | 215 | | 108 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **505** |
| | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| Eastbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| | Left | 3 | 442 | | 162 | |
| | Left/Through | 0 | | | | |
| Westbound | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 681 | 314 | 184 | 184 |
| | Total Lanes | 5 | | | | |

*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **184** |
| | | **Total Intersection Critical Volumes** | **689** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.484** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.384** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP B | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 285 | | 157 | 157 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 215 | 191 | 24 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **157** |
| Eastbound | Left | 2 | 695 | | 382 | 382 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,010 | | 505 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 442 | | 221 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 681 | 78 | 603 | 603 |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **985** |
| | | | **Total Intersection Critical Volumes** | | | **1,142** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.801** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.701** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP A | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 55 | | | |
| | Left/Through | 1 | | | 154 | |
| | Through | 0 | 159 | | | |
| | Through/Right | 1 | | | 154 | 154 |
| | Right | 0 | 93 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 176 | | 124 | 124 |
| | Left/Through | 1 | | | 124 | |
| | Through | 0 | 73 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 98 | 98 | 0 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **278** |
| Eastbound | Left | 1 | 93 | | 93 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,152 | | 582 | 582 |
| | Through/Right | 1 | | | 582 | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 78 | | 78 | 78 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 997 | | 369 | |
| | Through/Right | 1 | | | 369 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **660** |
| | | **Total Intersection Critical Volumes** | **938** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.658** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.558** |
| | | **Level of Service (LOS)** | **A** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP B | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 55 | | | |
| | Left/Through | 1 | | | 214 | 214 |
| | Through | 0 | 159 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 93 | 0 | 93 | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 2 | 176 | | 97 | 97 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 73 | | 73 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 98 | 98 | 0 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **311** |
| Eastbound | Left | 1 | 93 | | 93 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,152 | | 582 | 582 |
| | Through/Right | 1 | | | 582 | |
| | Right | 0 | 13 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 78 | | 78 | 78 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 997 | | 369 | |
| | Through/Right | 1 | | | 369 | |
| | Right | 0 | 110 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **660** |
| | | | **Total Intersection Critical Volumes** | | | **971** |
| **Number of Clearance Intervals** | | **3** | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.681** |
| **Signal Coordination** | | **ATSAC + ATCS** | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.581** |
| | | | **Level of Service (LOS)** | | | **A** |

*North/South Opposed Phasing*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | AM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| | Left | 1 | 32 | | 32 | |
| | Left/Through | 0 | | | | |
| Northbound | Through | 1 | 939 | | 547 | 547 |
| | Through/Right | 1 | | | 547 | |
| | Right | 0 | 155 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 2 | 424 | | 233 | 233 |
| | Left/Through | 0 | | | | |
| Southbound | Through | 1 | 1,129 | | 580 | |
| | Through/Right | 1 | | | 580 | |
| | Right | 0 | 32 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **780** |
| | Left | 1 | 54 | | 44 | |
| | Left/Through | 1 | | | 44 | |
| Eastbound | Through | 0 | 38 | | | |
| | Through/Right | 1 | | | 44 | 44 |
| | Right | 0 | 39 | 0 | | |
| | Total Lanes | 3 | | | | |
| | Left | 1 | 162 | | 152 | |
| | Left/Through | 0 | | | | |
| Westbound | Left/Through/Right | 1 | 80 | | 152 | 152 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 447 | 233 | 152 | |
| | Total Lanes | 3 | | | | |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **196** |
| | | **Total Intersection Critical Volumes** | **976** |
| **Number of Clearance Intervals** | **4** | **Intersection Capacity** | **1,375** |
| | | **Base CMA** | **0.710** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.610** |
| | | **Level of Service (LOS)** | **B** |

**PM Peak Hour**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP A | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 489 | | 244 | 244 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 662 | 662 | 0 | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 659 | | 362 | 362 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 467 | | 234 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **606** |
| Eastbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Westbound | Left | 3 | 1,254 | | 460 | 460 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 2 | 538 | 538 | 0 | |
| | Total Lanes | 5 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **460** |
| | | | **Total Intersection Critical Volumes** | | | **1,066** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.748** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.648** |
| | | | **Level of Service (LOS)** | | | **B** |

*WB Rt. Turn Overlap with SB Left*

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 9 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Via Marina<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP B | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 0 | | | | |
| Southbound | Left | 2 | 659 | | 362 | 362 |
| | Left/Through | 0 | | | | |
| | Through | 0 | 0 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 467 | 134 | 333 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **362** |
| Eastbound | Left | 2 | 489 | | 269 | 269 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 662 | | 331 | |
| | Through/Right | 0 | | | | |
| | Right | 0 | 0 | 0 | | |
| | Total Lanes | 4 | | | | |
| Westbound | Left | 0 | 0 | | | |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,254 | | 627 | 627 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 538 | 181 | 357 | |
| | Total Lanes | 3 | | | | |
| | | | **Sum of East/West Critical Volumes** | | | **896** |
| | | | **Total Intersection Critical Volumes** | | | **1,258** |
| **Number of Clearance Intervals** | **3** | | **Intersection Capacity** | | | **1,425** |
| | | | **Base CMA** | | | **0.883** |
| **Signal Coordination** | **ATSAC + ATCS** | | **Signal Coordination Adjustment** | | | **-0.100** |
| | | | **Final CMA** | | | **0.783** |
| | | | **Level of Service (LOS)** | | | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way | | |
| | East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP A | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 36 | | | |
| | Left/Through | 1 | | | 106 | |
| | Through | 0 | 105 | | | |
| | Through/Right | 1 | | | 106 | 106 |
| | Right | 0 | 71 | 0 | | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 1 | 419 | | 286 | 286 |
| | Left/Through | 1 | | | 286 | |
| | Through | 0 | 153 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 175 | 118 | 57 | |
| | Total Lanes | 3 | | | | |
| | | | Sum of North/South Critical Volumes | | | **392** |
| Eastbound | Left | 1 | 52 | | 52 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,305 | | 661 | 661 |
| | Through/Right | 1 | | | 661 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 126 | | 126 | 126 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,544 | | 551 | |
| | Through/Right | 1 | | | 551 | |
| | Right | 0 | 108 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **787** |
| **Total Intersection Critical Volumes** | **1,179** |
| **Intersection Capacity** | **1,425** |
| **Base CMA** | **0.827** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.727** |
| **Level of Service (LOS)** | **C** |

**Number of Clearance Intervals** **3**

**Signal Coordination** **ATSAC + ATCS**

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 10 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Palawan Way<br>East/West: Admiralty Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP B | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 0 | 36 | | | |
| | Left/Through | 1 | | | 141 | 141 |
| | Through | 0 | 105 | | | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 71 | 0 | 71 | |
| | Total Lanes | 2 | | | | |
| Southbound | Left | 2 | 419 | | 229 | 229 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 153 | | 153 | |
| | Through/Right | 0 | | | | |
| | Right | 1 | 175 | 118 | 57 | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **370** |
| Eastbound | Left | 1 | 52 | | 52 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,305 | | 661 | 661 |
| | Through/Right | 1 | | | 661 | |
| | Right | 0 | 18 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 126 | | 126 | 126 |
| | Left/Through | 0 | | | | |
| | Through | 2 | 1,544 | | 551 | |
| | Through/Right | 1 | | | 551 | |
| | Right | 0 | 108 | 0 | | |
| | Total Lanes | 4 | | | | |

*North/South Opposed Phasing*

| | | | |
|---|---|---|---|
| | | **Sum of East/West Critical Volumes** | **787** |
| | | **Total Intersection Critical Volumes** | **1,157** |
| **Number of Clearance Intervals** | **3** | **Intersection Capacity** | **1,425** |
| | | **Base CMA** | **0.812** |
| **Signal Coordination** | **ATSAC + ATCS** | **Signal Coordination Adjustment** | **-0.100** |
| | | **Final CMA** | **0.712** |
| | | **Level of Service (LOS)** | **C** |

**Hirsch/Green Transportation Consulting, Inc.**
**Critical Movement Analysis (CMA) Worksheet**

| | | | |
|---|---|---|---|
| **Project Name** | Marina del Rey - Parcel 44 Project | | |
| **Intersection Number** | 16 | **Date** | October 7, 2013 |
| **Intersection Name** | North/South: Admiralty Way<br>East/West: Mindanao Way | | |
| **Intersection Control** | Signalized | | |
| **Analysis Period** | PM Peak Hour | | |
| **Analysis Scenario** | Future (2016) With Cumulative Dev. Plus Cumulative Mitigation (LACo Only) - LUP | | |

| Approach Direction | Lane Type | No. of Lanes | Approach Volumes | Right-Turn on Red | Assigned Lane Volumes | Critical Moves |
|---|---|---|---|---|---|---|
| Northbound | Left | 1 | 34 | | 34 | |
| | Left/Through | 0 | | | | |
| | Through | 1 | 925 | | 568 | 568 |
| | Through/Right | 1 | | | 568 | |
| | Right | 0 | 211 | 0 | | |
| | Total Lanes | 3 | | | | |
| Southbound | Left | 2 | 472 | | 260 | 260 |
| | Left/Through | 0 | | | | |
| | Through | 1 | 1,094 | | 574 | |
| | Through/Right | 1 | | | 574 | |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 4 | | | | |
| | | | **Sum of North/South Critical Volumes** | | | **828** |
| Eastbound | Left | 1 | 184 | | 129 | |
| | Left/Through | 1 | | | 129 | |
| | Through | 0 | 149 | | | |
| | Through/Right | 1 | | | 129 | 129 |
| | Right | 0 | 55 | 0 | | |
| | Total Lanes | 3 | | | | |
| Westbound | Left | 1 | 437 | | 337 | |
| | Left/Through | 0 | | | | |
| | Left/Through/Right | 1 | 165 | | 337 | 337 |
| | Through/Right | 0 | | | | |
| | Right | 1 | 668 | 260 | 337 | |
| | Total Lanes | 3 | | | | |

*East/West Opposed Phasing*
*WB Rt. Turn Overlap with SB Left*

| | |
|---|---|
| **Sum of East/West Critical Volumes** | **466** |
| **Total Intersection Critical Volumes** | **1,294** |
| **Intersection Capacity** | **1,375** |
| **Base CMA** | **0.941** |
| **Signal Coordination Adjustment** | **-0.100** |
| **Final CMA** | **0.841** |
| **Level of Service (LOS)** | **D** |

**Number of Clearance Intervals** **4**

**Signal Coordination** **ATSAC + ATCS**

***No Further Feasible Cumulative Mitigation For:***

***Intersection No. 14, Admiralty Way and Bali Way***

# APPENDIX 4.10.1

## Sewer Area Study

BREEN
Engineering Inc

# PC 12234 AS

# Sewer Area Study
## for
# Parcel 44 Marina Del Rey, California

**13443 BALI WAY**
**LOS ANGELES 90292**
**COUNTY OF LOS ANGELES**
**BEI PROJECT #187-07-003C**
**TG 672-B7**

*Prepared by*


**Breen Engineering, Inc.**
**1983 W. 190th Street, Suite 200**
**Torrance CA 90504**


*Prepared for*

**Pacific Marina Ventures**

**August 4, 2014**
**Revised August 27, 2014**
**Revision 2 September 3, 2014**

REGISTERED PROFESSIONAL ENGINEER
SARAH KATHRYN CURRAN
No. 69620
Exp. 06-30-2016
CIVIL
STATE OF CALIFORNIA

THIS AREA STUDY IS APPROVED FOR PARCELL 44 AND IS VALID FOR TWO (2) YEARS FROM DATE OF APPROVAL.

SEWER AREA STUDY
APPROVED FOR PARCELL 44

APPROVED BY: T. Khalbhali RCE NO. 52443 DATE 9/25/14

CHECKED BY: Abed M, Jeff B, Tony K DATE 9/25/14

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

INDEX

## 1. Introduction

The following report was produced to determine the impacts of the proposed Parcel 44 (P44) and Fisherman's Village (FV) combined developments on the downstream, public sewer system. This was deemed necessary to supplement the County's Master Sewer Area Study, and previous Breen Engineering Sewer Area Study, by assessing the impacts to the overflow sewer, should the nearby pump station be taken out of service temporarily for maintenance or otherwise.

## 2. Site Description

This site is located approximately 1100 ft south of Lincoln Blvd. and the Marina Expressway, along Admiralty Way, between Bali Way and Mindanao Way. The address of the site is 13443 Bali Way, Marina del Rey, CA 90292. Assessor's I.D. No. 4224-008-901, Thomas Guide Page No. 672-B7.

## 3. Project Description

This project is a developed lot. The re-development will include 73,400 square feet of new buildings with concrete paved parking, driveways and landscape areas, situated on 8.4 acres.

## 4. Sewer Capacity Analysis

### a.) Existing sewer capacity

The tributary sewer flow rates (Q) for the studied sewer lines were provided by the US$^3$ Utility System Science & Software Sewer Flow Monitoring Report, July 2014. The County identified five manholes to be tested. Manholes (MH) 186 and 181 were upstream and downstream, respectively, of the Fisherman's Village site on Fiji Way. Manholes 145 and 134 are upstream of the existing County Pump Station in Bali Way. Manhole 61 is located within the promenade adjacent to Via Marina. See Appendix I for US$^3$ Report.

Metered flow rates for MH 186 and 181 were provided to determine the actual flow from the existing Fisherman's Village site. Metered flow rates for MH 145 and 134 were provided to determine the existing flow tributary to the Pump Station. Metered flow rate at MH 61 was provided to determine the existing flow in the overflow sewer, should the Pump Station ever go out of service.

The following table provides metered flow rates for the five manholes:

| Manhole | Pipe Size (in.) | Metered Level (in.) | Metered Flow (cfs) |
|---|---|---|---|
| 134 | 12 | 4.59 | 0.405 |
| 145 | 15 | 3.58 | 0.360 |
| 61 | 15 | 8.40 | 1.159 |
| 186 | 10 | 6.52 | 0.612 |
| 181 | 10 | 7.50 | 0.719 |

### b.) Additional Flows Resulting From Parcel 44 and Fisherman's Village Redevelopment

In order to determine the existing flows from the Parcel 44 development, the County's table "Estimated Average Daily Sewage Flows for Various Occupancies" (Appendix II) was used. To determine the Peak Daily Flow (PDF), the multiplier of 2.5 was applied to the calculated Average Daily Flow. See Appendix II for this calculation. *Existing P44 PDF = 0.1263 cfs.*

The same table was used to calculate the proposed flows based on the eventual redevelopment of the Parcel 44 site. See Appendix II. *Proposed P44 PDF =0.2059 cfs.*

Therefore, additional flows resulting from the proposed P44 improvement project are the difference: *Additional P44 PDF = 0.2059 cfs - 0.1263 cfs =* ***0.0796 cfs.***

In order to determine the existing flows from the Fisherman's Village development, metered flow rates for MH 186 and 181 were subtracted. See Appendix III.
*Existing FV PDF = 0.719cfs - 0.612cfs = 0.107 cfs*

Proposed flows were provided by LA County DPW: *Proposed FV PDF = 0.2815 cfs*

Therefore, additional flow resulting from the proposed Fisherman's Village improvement project is the difference: *Additional FV PDF = 0.2815 cfs - 0.1064 cfs =* ***0.1751 cfs***

The total additional flow resulting from the Parcel 44 and Fisherman's Village redevelopment projects is **0.1751 cfs + 0.0796 cfs = 0.2547 cfs, Total Additional PDF**

**c.) Impacts to sewer in an overflow condition**

If the pump station were to be taken offline, sewerage would overflow to the metering structure at Marquesas Way. Manhole 61 is located within a 15" line, near to that metering structure. Metered flow results indicate that, in a non-overflow condition, the maximum flow rate is 1.159cfs. Using Kutter's Formula with n=0.013, this translates to a depth of 7.8 inches. (See spreadsheet in Appendix IV) In its existing condition, the 15" line is operating at 58.14% capacity.

In an overflow situation, flow which is normally pumped from Bali Way, would be diverted to this 15" line. *The total additional flow to the 15" line would be the metered flow at Manholes 134 and 135 = 0.405 + 0.360 = 0.77 cfs, for a total flow of 1.159+.77 cfs = 1.924 cfs.* Using Kutter's Formula with n=0.013, this translates to a depth of 11.00inches. (See spreadsheet in Appendix IV.) In its existing, overflow condition, the 15" line is operating at 96.52% capacity.

After the proposed redevelopment of Parcel 44, the total flow to the 15" line in an overflow condition would include the additional 0.0796 *cfs = > 1.924 cfs + 0.080 cfs = 2.004cfs* Using Kutter's Formula with n=0.013, this translates to a depth of 11.25 inches. (See spreadsheet in Appendix IV)
***In a proposed, overflow condition, the 15" line is operating at 100.54% capacity.***

After the proposed redevelopment of Parcel 44 and Fisherman's Village, the total flow to the 15" line in an overflow condition would include the additional 0.2547 *cfs = > 1.924 cfs + 0.255 cfs = 2.179 cfs* Using Kutter's Formula with n=0.013, this translates to a depth of 12.25 inches. (See spreadsheet in Appendix IV) ***In a proposed, overflow condition, the 15" line is operating at 109.32% capacity.***

## 5. Conclusion

Based on the sewer area study calculations above and attached, in an overflow condition, the existing sewer system which would accept overflow from the Bali Way Pump station to the metering structure at Marquesas Way, can accommodate the calculated flow resulting from the P44 development.

Our firm therefore concludes that the existing sewer has adequate capacity for the proposed development and No further mitigation is required on existing system between the proposed project's connection and the Trunk sewer.

# Appendix I – $US^3$ Report

UTILITY SYSTEMS SCIENCE & SOFTWARE

# SEWER FLOW MONITORING

*Leader in Wireless Temporary Sewer Flow Monitoring*

Sales Office: 601 N. Parkcenter Drive, Suite 209
Santa Ana, Ca 92705 Phone: 714-542-1004
Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

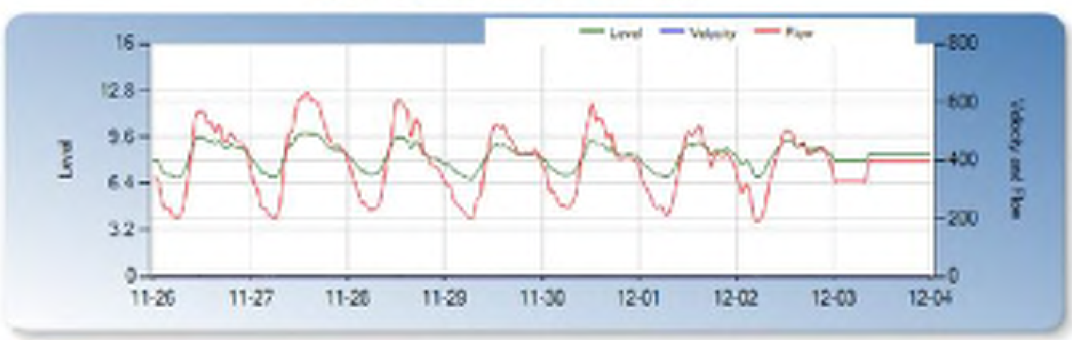
# Flow Report 7/2014

***Marina Del Rey***

***Breen Engineering***

1983 W 190th St
Suite 200
Torrance, CA 90504

Site 5 - Bedford: Pipe Size:16 in.





| Site Info | | | |
|---|---|---|---|
| Description: | In Street | Address: | [illegible] |
| Manhole No: | [illegible] | City: | |
| Pipe Diameter: | 16 | State: | |
| Group: | Collection System 3 | Zip Code: | |

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Contents

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Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

## Who we are:

***Utility Systems, Science and Software, Inc. (US$^3$),*** was founded in 2002 as a specialty technical engineering service company with its headquarters located in Santa Ana, California and Service and Engineering Facilities in San Diego, Sacramento.

The owners and management team are all professional and degreed engineers and have extensive experience in the application and implementation of Water/Waste Water and associated Process Control Projects. We are currently working in many facilities throughout the USA and are selectively guiding the growth of our business into markets and areas where we can provide the highest quality value of service to our clients.

US$^3$ supports Municipalities, Consulting Engineering firms and other water/waste water systems integrators by providing technical services for engineering, software programming, technical site maintenance and calibration site support work primarily in the Water and Waste Water industries.

**Services Include:**

- Sewer Monitoring
  - US3 installs and maintains Marsh-McBirney Meters for Sewer Monitoring. US3 will then interface the standard MM Meter for Real-time Web-Based Wireless Flow Monitoring using CDMA, GPRS/GSM, VHF/UHF/Trunk radio networks (including Motorola Networks). US3 provides the following:
  - Detailed Preliminary Investigation.
  - Validate Hydraulic Suitability,
  - Provide Detailed Site Data,
  - Install Meter to Exact Specifications,
- Interface Rain Gauge Instrumentation,
- Provide Communications to all instruments,
- Train Utility Engineers and Technicians how to access Web-Based Data,
- Provide complete Calibration and Maintenance Services.
- SSO Monitoring & Event Notification
- US3 provides simple, cost effective, wireless SSO/CSO Monitoring & Event Notification. This information will be sent to your cell phone, pager, work/home phone and/or email.

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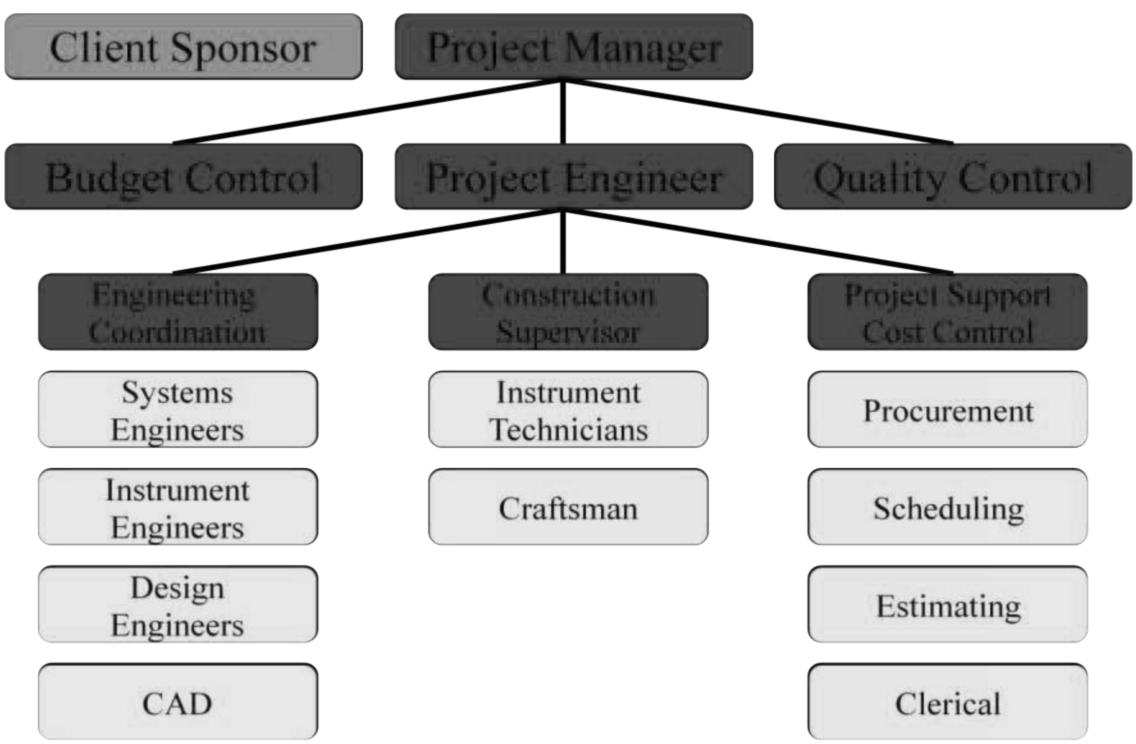
- **Flow Meter Maintenance**
    - US3 provides supplemental or dedicated maintenance Marsh-McBirney service for short-term or long-term requirements. Our highly trained and skilled technicians are experts in all phases of waste monitoring system maintenance
- **Sanitary System Evaluation Services**
- US3 has experienced licensed civil engineers who can work with City or County personnel to develop a comprehensive SSES program.
- US3 provides the procedures, equipment, and results of each activity performed during the investigation. US3 will develop a report to discuss the existing sanitary sewer collection system, identifies the system defects and problem areas, prioritizes and ranks the inflow/infiltration sewer segments, and details the recommended improvements. The report also includes a preliminary cost estimate associated with the selected rehabilitation methods to effectively reduce inflow/infiltration volumes and extend the useful life of the existing piping.

**Project Management Approach:**

Our Structure for Project Management puts “Checks and Balances” in to ensure the Customer is satisfied with the solutions and product provided.



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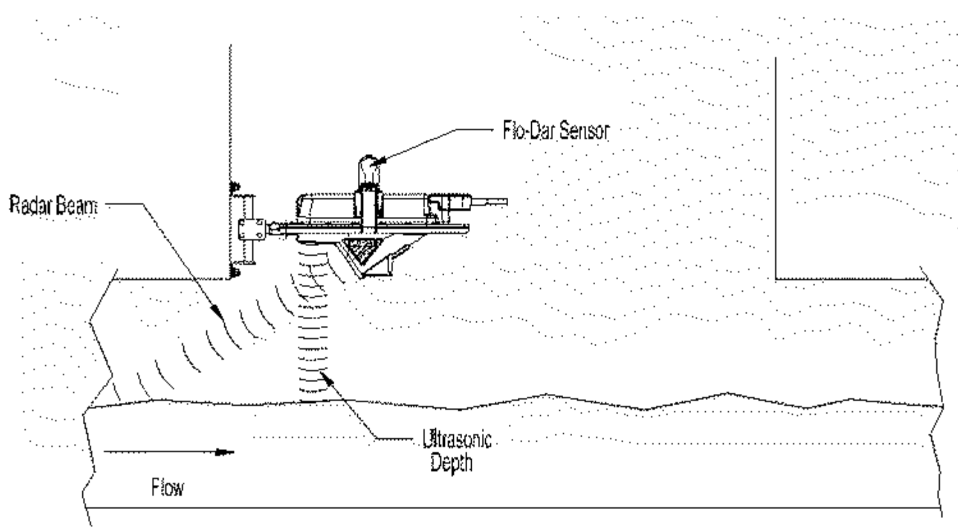
## Flow Meter Used in your Flow Study

Flo-Dar incorporates a Doppler Radar Velocity Sensor and Ultrasonic Depth Transducer for use in Open Channel Applications. It is available with a Permanent Flo-Station. The Flo-Station is available with or without a display and is powered with 120/240 VAC, or 12 VDC. The Flo-Station requires Flo-Ware software, which is included on some models, and a customer supplied PC. Flo-Station with display shows flow rate, total flow, velocity and level. Both Flo-Station's have four outputs one each for level, velocity, flow rate, surcharge level, and a contact closure.

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# Specifications

## Flo-Dar Sensor Information:

**Enclosure**
Material: Polystyrene
Dimensions: 6.9" W x 16.65" L x 11.7" D
(17.5 cm x 42.3 cm x 29.7 cm)
Weight: 10.5 lbs. (4.8 kg)
**Temperature**
Operating Range: 14° F to 122°F
(-10° C to 50° C)
Storage Range: -40° F to 140° F
(-40° C to 60° C)
**Velocity Measurement**
Method: Radar
Range: 0.75 to 20 ft/s (0.23 m/s to 6.10 m/s)
Accuracy: ±0.5%; ±0.1 ft/s (±0.03 m/s)
**Level Measurement**
Method: Ultrasonic
Standard Operating Range:
0.25 to 60 in. (0.634 to 152.4 cm)
Optional Operating Range: 0 (0 cm) to 240" (6.1 m)
(with 18" dead band)
Temperature Compensated
Accuracy: ±0.1 in. (±0.25 cm)
1% Accuracy
**Surcharge Conditions Level/Velocity**
Level
Method: Piezo-resistive pressure transducer
Maximum Range: 138 inches (3.5 meters)
Velocity
Method: Electromagnetic
Range: -5 to +20 ft/s (-1.5 to +6.1 m/s)

## Flow Station information:

**Data Storage**
64K (16K cycles of velocity/level data)
**Local Terminal**
RS232C at 19.2K baud
Timebase Accuracy: 1 second per day
**Outputs:** Four 4-20 mA outputs; system-isolated,
up to 600Ω load. Each output is selectable between FLOW,
LEVEL, VELOCITY OR SURCHARGE LEVEL.
**Power Requirements**
AC: 85-264 VAC, 47-63 Hz. 32 watts
DC: 12 VDC for Flo-Station without Display or
Flo-Station with Display (Backlight Off)
180 mA (2.1 watts) with (1) 4-20 mA utilized.
**Housing** Material: ABS Plastic, NEMA 4
Dimensions: 10.2" W x 9.3" H x 4" D
(25.9 cm W x 23.6 cm H x 10.2 cm D)
**Weight: 5 lbs.**
**Temperature Operating Range:** 14° F to 122° F
(-10° C to 50° C)
**Temperature Storage Range:**
(without display) -40°F to 140°F (-40°C to 60°C)
(with display) 4°F to 140°F (-20°C to 60°C) w/Display

Monday, July 21, 2014

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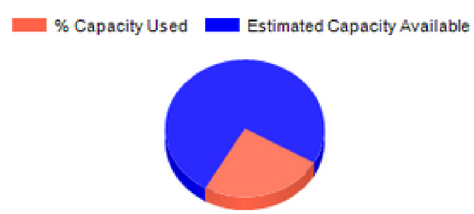
## Summary of Sites

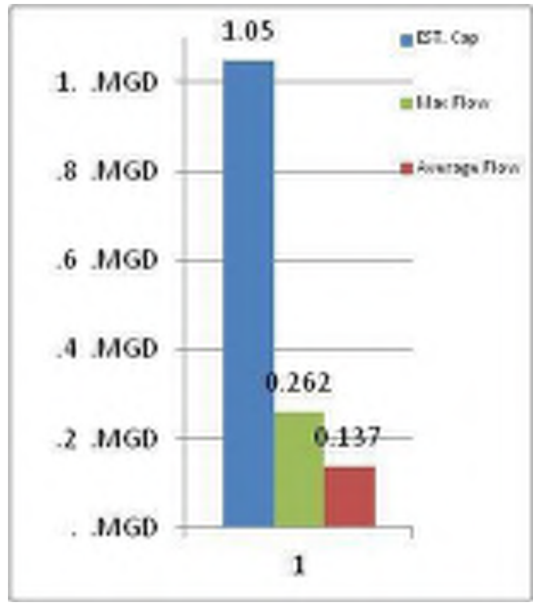
**Site 1 #134** This is a 12 Inch Pipe Running at or near 25% Capacity. This is located at the entry to a Pump Station. Flows are somewhat slow but consistent. The Level seems to follow a diurnal curve similar to having a combination Residential and commercial flow. On the velocity there seems to be some pulsation from some process flow nearby.

| | | | |
|---|---|---|---|
| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 1.330 | 3.100 | 0.137 |
| Maximum | 2.039 | 4.594 | 0.262 |
| Minimum | 0.580 | 1.928 | 0.045 |
| Pipe Size | | 12.000 | |
| Estimated Capacity (mgd) | | 1.052 | |
| Capacity Used | | 24.93 % | |
| Sensor Type | | Hach - Flodar | |

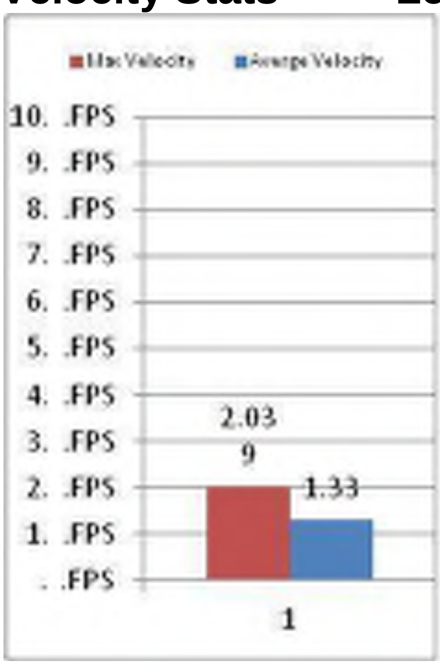
Estimated Capacity Usage



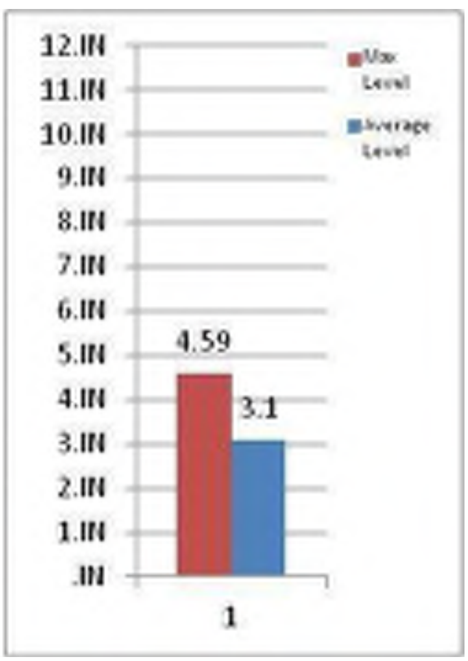

## Flow Stats




## Velocity Stats




## Level Stats



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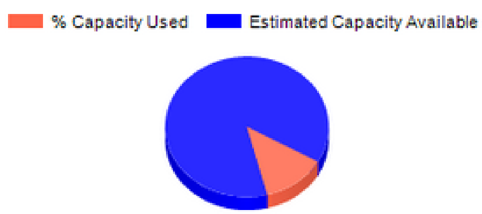
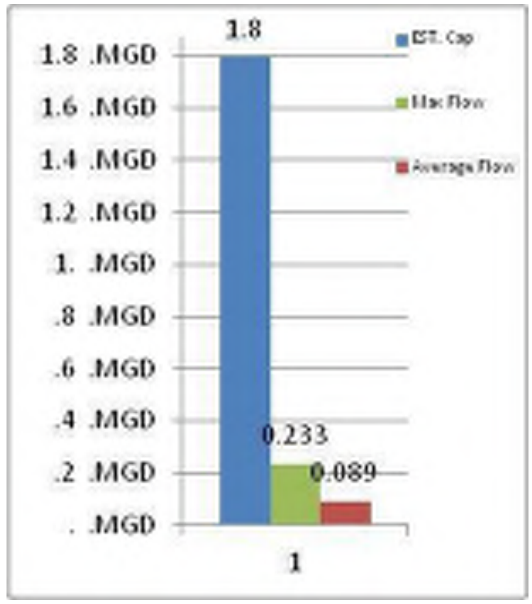
**Site 2 #145** This is a 15 Inch Pipe Running at or near 13% Capacity. This is located at the entry to a Pump Station. Flows are somewhat slow but consistent. The Level seems to follow a commercial flow. On the velocity there seems to be some pulsation from some process flow nearby.

| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
|---|---|---|---|
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 0.921 | 2.651 | 0.089 |
| Maximum | 1.729 | 3.580 | 0.233 |
| Minimum | 0.490 | 0.206 | 0.001 |
| Pipe Size | | 15.000 | |
| Estimated Capacity (mgd) | | 1.847 | |
| Capacity Used | | 12.61 % | |
| Sensor Type | | Hach - Flodar | |

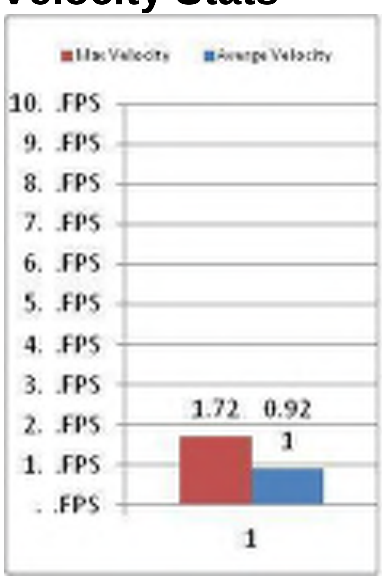
Estimated Capacity Usage



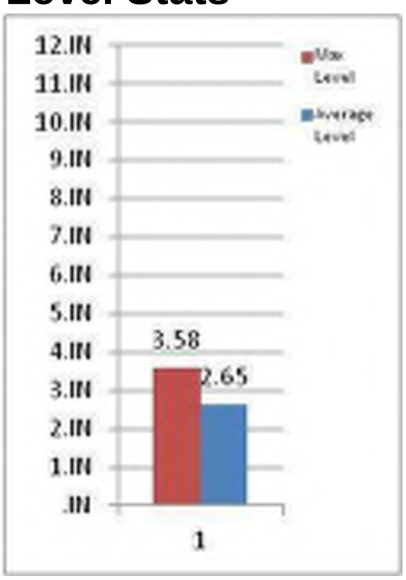

## Flow Stats




## Velocity Stats




## Level Stats



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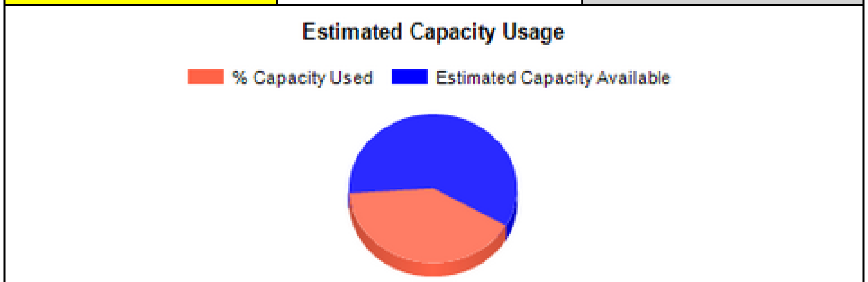
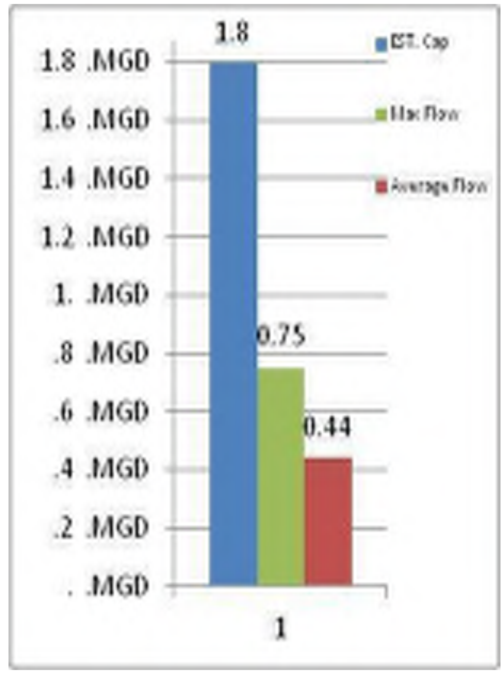
**Site 3 #61** This is a 15 Inch Pipe Running at or near 40% Capacity. The Flows seems to follow a Residential flow. Manhole looked good and clean. Good Velocity seems to follow Manning Curve well.

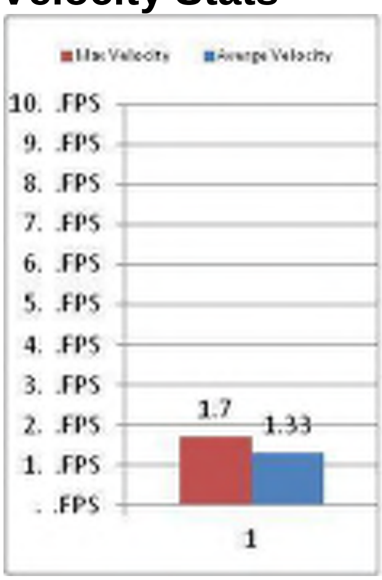
| | | | |
|---|---|---|---|
| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 1.332 | 6.431 | 0.448 |
| Maximum | 1.709 | 8.399 | 0.750 |
| Minimum | 0.569 | 3.206 | 0.081 |
| Pipe Size | | 15.000 | |
| Estimated Capacity (mgd) | | 1.847 | |
| Capacity Used | | 40.60 % | |
| Sensor Type | | Hach - Flodar | |



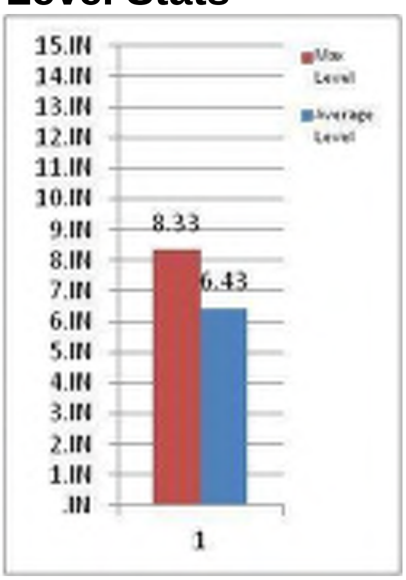

## Flow Stats




## Velocity Stats



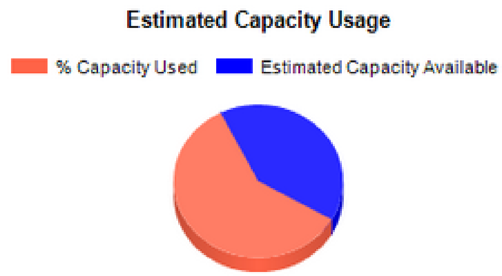

## Level Stats



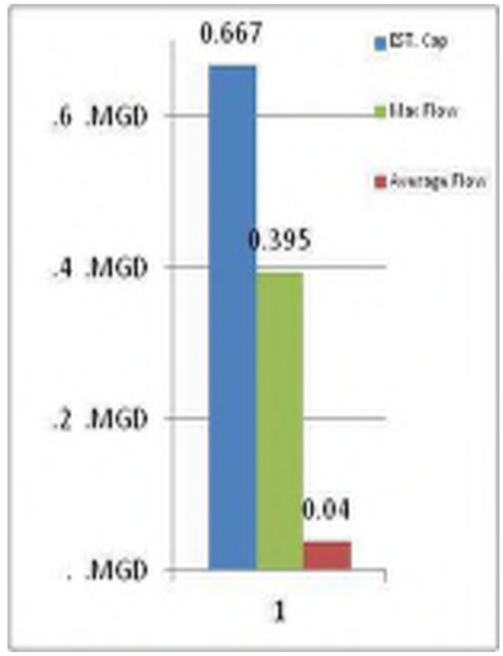
Sales Office: 601 N. Parkcenter Drive, Suite 209
Santa Ana, Ca 92705 Phone: 714-542-1004
Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

**Site 4 #186:** Site is a 10 inch pipe with very low Velocities. Velocity is at the low limits of the flow meter. Line looks to have significant silt and debris in the line. When removing the meter we noticed the line is backing up a bit. Because of the backing up in the line the Capacity is at or near 60%. If line were to be cleaned the capacity would be more in the range of 30%.

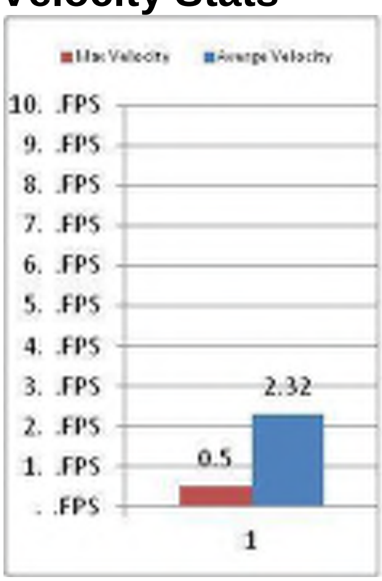
| | | | |
|---|---|---|---|
| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 0.506 | 2.800 | 0.044 |
| Maximum | 2.320 | 6.520 | 0.396 |
| Minimum | 0.000 | 1.030 | 0.000 |
| Pipe Size | | 10.000 | |
| Estimated Capacity (mgd) | | 0.667 | |
| Capacity Used | | 59.32 % | |
| Sensor Type | | Hach - Flodar | |



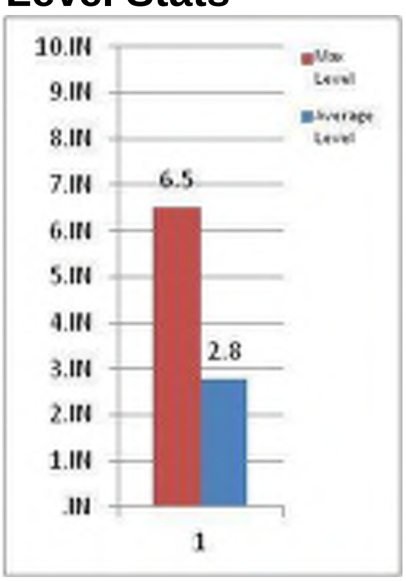

## Flow Stats




## Velocity Stats




## Level Stats

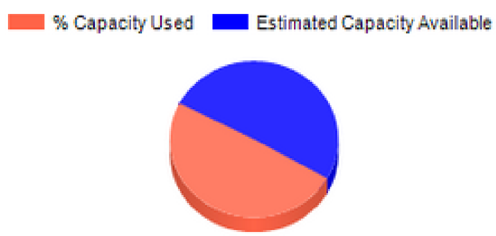


Sales Office: 601 N. Parkcenter Drive, Suite 209
Santa Ana, Ca 92705 Phone: 714-542-1004
Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

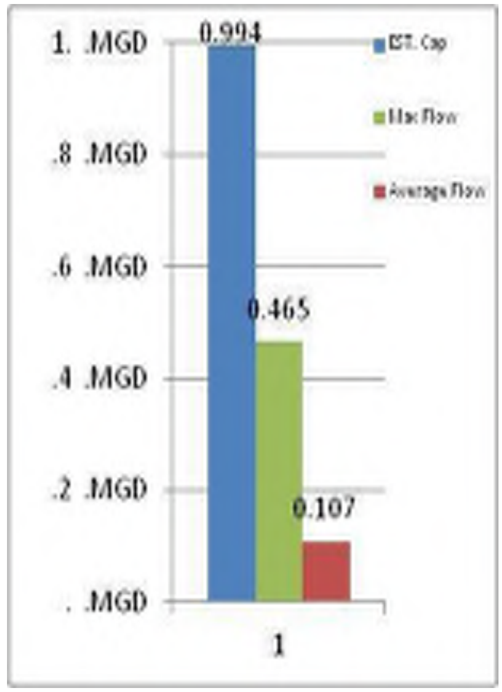
**Site 5 #181** This is a 10 Inch Pipe Running at or near 50% Capacity. Flows are somewhat slow but consistent. The Level seems to follow a diurnal curve similar to having a combination Residential and commercial flow. There is a comment from my Crews that there seems to be significant grease in this line. Also toward the end of the study this site being effected by a possible backup from site #186. If line were to be cleaned out this would significantly improve the capacity of the line. On the velocity there seems to be some pulsation from some process flow nearby.

| | | | |
|---|---|---|---|
| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 0.593 | 5.142 | 0.107 |
| Maximum | 1.839 | 7.496 | 0.465 |
| Minimum | 0.000 | 3.233 | 0.000 |
| Pipe Size | | 10.000 | |
| Estimated Capacity (mgd) | | 0.944 | |
| Capacity Used | | 49.30 % | |
| Sensor Type | | Hach - Flodar | |

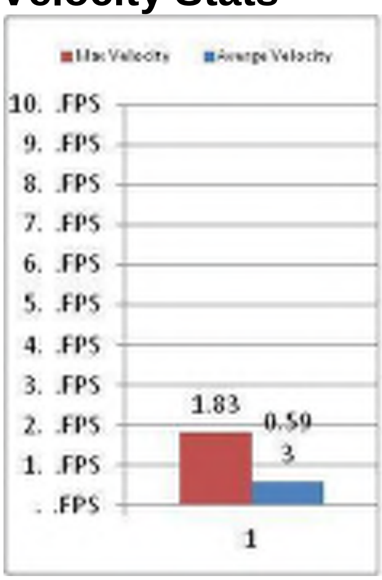
Estimated Capacity Usage



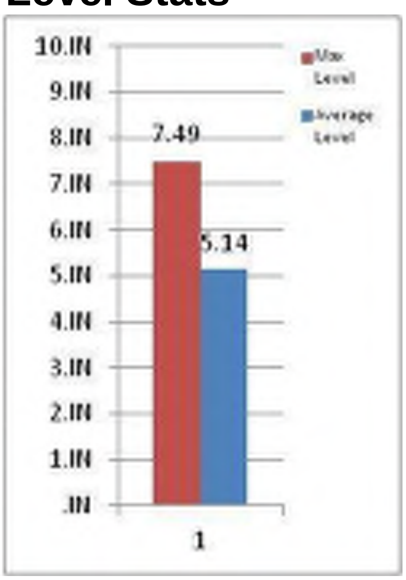

## Flow Stats




## Velocity Stats




## Level Stats



Sales Office: 601 N. Parkcenter Drive, Suite 209
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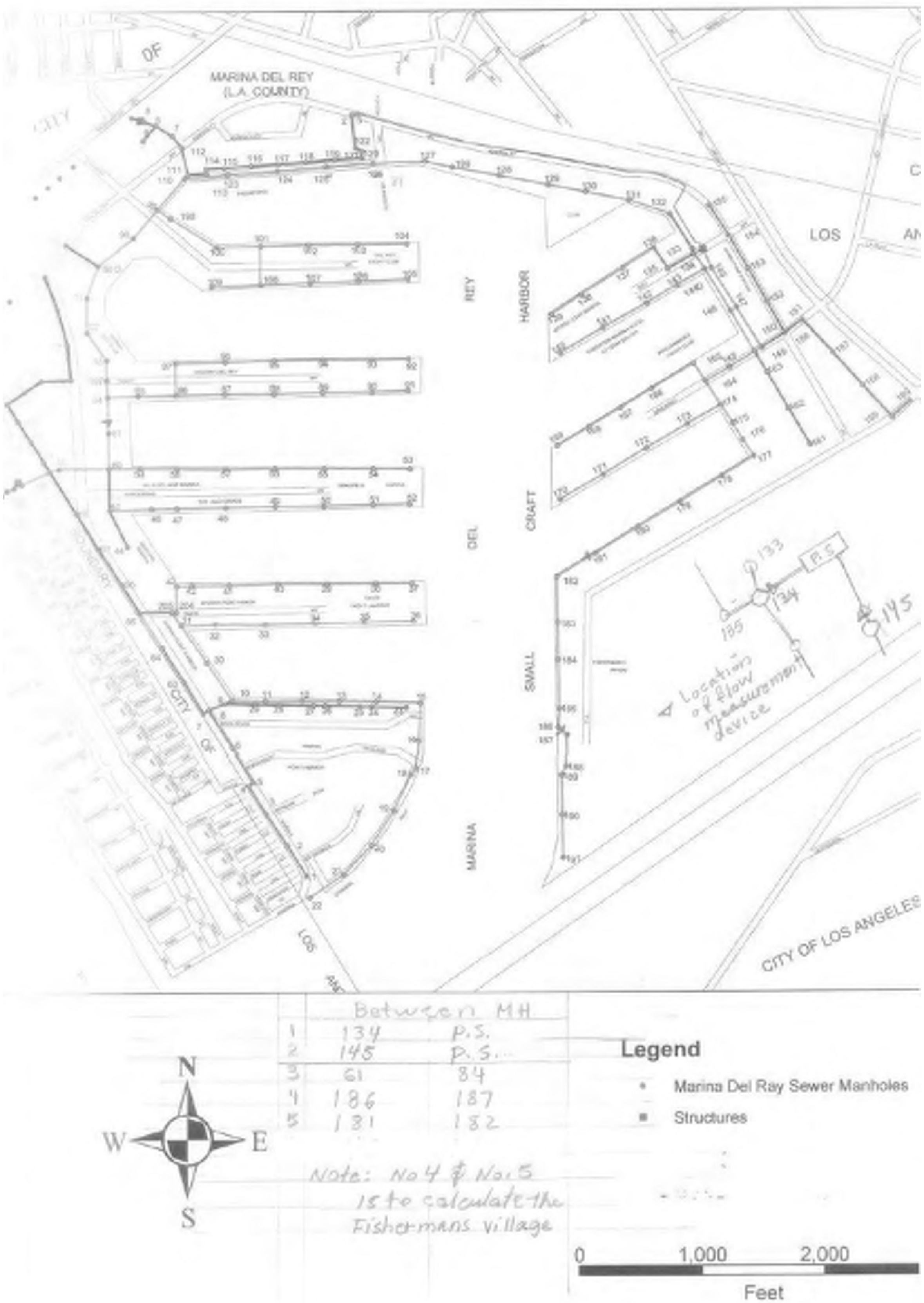
Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

## Customer Maps

# MARINA DEL REY SMD SEWER



Sales Office: 601 N. Parkcenter Drive, Suite 209
Santa Ana, Ca 92705 Phone: 714-542-1004
Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

## Confined Space Installation

US3 Installation Practices does not require Full Confined space entry into the Manhole. We do cross the plane with our hands and arms but never actually enter the Manhole. We do take Gas readings and Fill out the confined space permitting. All of our Technicians have been fully trained in Confined Space and CPR.


CONFINED SPACES
Dangerous Places

J. J. Keller
& Associates, Inc.
Since 1953

mployee: Greg Serres
structor: Thomas Williams
ompany: US3
ate: 6-10-2013

200 BC (12814)

## Technicians:

Greg Serres
Gus Williams

Sales Office: 601 N. Parkcenter Drive, Suite 209
Santa Ana, Ca 92705 Phone: 714-542-1004
Engineering Office: 6190 Fairmont Ave Suite E
San Diego, Ca 92120 Phone: 619-546-4281

# Report Data

Site Report 07-21-2014

**Confidential Proprietary Information**

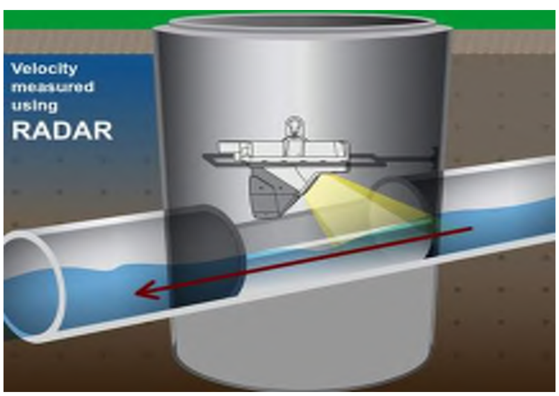
Breen Engineering marina pump station on Bali way

site 1 #134 Manhole No.134

| | | |
|---|---|---|
| Access:<br>Manhole | System Type:<br>Sanitary [X] Storm [ ] | Install Date: 6/30/2014 |

Map


Technology




Traffic Plan

| Flow Meter | | | |
|---|---|---|---|
| Meter Depth ":17' | | | |
| Meter SN ":****** | | | |
| steady | | | |
| Avg Velocity | Avg Measured Level | | Multiplier |
| 1.35 | 3.25 | | 1 |
| **Gas** | | | |
| O2 | H2S | CO | LEL |
| 20.9 | 0 | o | 0 |
| **Notes** | | | |
| | | | |
| **Traffic Safety** | | | |
| closed center median, signs cones, lights , | | | |
| **Land Use** | | | |
| Residential | Commercial | Industrial | Trunk |
| | X | | |

| | |
|---|---|
| Manhole Depth " | 20' |
| Pipe Size " | 12" |
| Inner Pipe Size " (In/Out) | 12"/12" |
| Pipe Shape | Round |
| Pipe Condition | good |
| Manhole Material | lined |
| Silt (inches) | 0 |
| Velocity Profile Data | 1.31 |
| Velocity Profile Taken | 2-4-8 |
| Sensor Offset | 21.91 |
| Sensor Dist. to Crown | 9.91 |
| Flow Direction | Upstream |
| Flow Heading | East |

Meter Site Document

Breen Engineering

site 1 #134

marina pump station on Bali way

Site

Manhole Before Install

Installation Process

Installed

Upstream

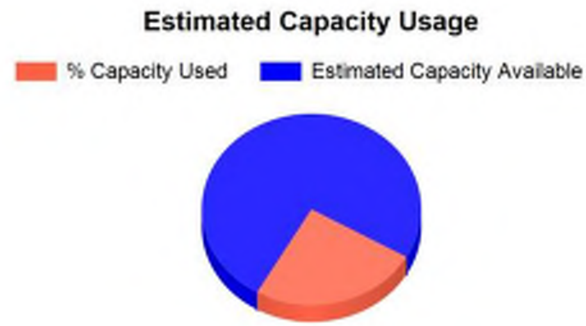
Downstream

# Temporary Flow Study

## Breen Engineering

site 1 #134

| | | | |
|---|---|---|---|
| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 1.330 | 3.100 | 0.137 |
| Maximum | 2.039 | 4.594 | 0.262 |
| Minimum | 0.580 | 1.928 | 0.045 |
| Pipe Size | | 12.000 | |
| Estimated Capacity (mgd) | | 1.052 | |
| Capacity Used | | 24.93 % | |
| Sensor Type | | Hach - Flodar | |




**Utility Systems, Science and Software**

**6190 Fairmount Ave. Suite E**
**San Diego, CA 92021**

**601 N. Parkcenter Drive Suite 209**
**Santa Ana, CA 92705**

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 370

# History for site 1 #134: 06/30/2014 thru 07/14/2014

| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Total Gal** | **Rain** |
| 6/30/2014 | 99.91 | 139.23 | 49.46 | 0.14 | 0.20 | 0.07 | 1.30 | 1.77 | 0.75 | 3.23 | 3.58 | 2.86 | 143,864 | |
| 7/1/2014 | 89.70 | 139.24 | 52.44 | 0.13 | 0.20 | 0.08 | 1.33 | 1.78 | 0.70 | 2.96 | 3.43 | 2.05 | 129,162 | |
| 7/2/2014 | 89.65 | 136.54 | 45.17 | 0.13 | 0.20 | 0.07 | 1.30 | 1.71 | 0.75 | 3.00 | 3.79 | 2.14 | 129,089 | |
| 7/3/2014 | 90.42 | 123.72 | 33.00 | 0.13 | 0.18 | 0.05 | 1.29 | 1.67 | 0.67 | 3.05 | 3.69 | 2.29 | 130,199 | |
| 7/4/2014 | 104.13 | 182.08 | 45.18 | 0.15 | 0.26 | 0.07 | 1.27 | 1.80 | 0.78 | 3.38 | 4.59 | 2.43 | 149,943 | |
| 7/5/2014 | 96.33 | 148.73 | 54.66 | 0.14 | 0.21 | 0.08 | 1.26 | 1.69 | 0.72 | 3.24 | 4.05 | 2.64 | 138,722 | |
| 7/6/2014 | 100.35 | 171.58 | 46.74 | 0.14 | 0.25 | 0.07 | 1.33 | 1.69 | 0.74 | 3.23 | 4.22 | 2.61 | 144,497 | |
| **Week:** | **95.78** | **182.08** | **33.00** | **0.14** | **0.26** | **0.05** | **1.30** | **1.80** | **0.67** | **3.16** | **4.59** | **2.05** | **965,476** | |
| 7/7/2014 | 98.24 | 137.14 | 53.56 | 0.14 | 0.20 | 0.08 | 1.37 | 2.01 | 0.78 | 3.12 | 3.97 | 2.32 | 141,462 | |
| 7/8/2014 | 92.91 | 144.77 | 33.96 | 0.13 | 0.21 | 0.05 | 1.36 | 1.99 | 0.58 | 3.01 | 4.05 | 2.08 | 133,784 | |
| 7/9/2014 | 94.84 | 156.87 | 46.14 | 0.14 | 0.23 | 0.07 | 1.38 | 1.93 | 0.69 | 3.04 | 4.21 | 2.07 | 136,565 | |
| 7/10/2014 | 98.02 | 176.19 | 43.18 | 0.14 | 0.25 | 0.06 | 1.35 | 1.95 | 0.84 | 3.15 | 4.48 | 2.00 | 141,142 | |
| 7/11/2014 | 90.18 | 153.96 | 31.07 | 0.13 | 0.22 | 0.04 | 1.34 | 1.85 | 0.73 | 2.97 | 4.07 | 1.97 | 129,859 | |
| 7/12/2014 | 95.50 | 179.24 | 53.15 | 0.14 | 0.26 | 0.08 | 1.40 | 2.03 | 0.88 | 3.01 | 4.07 | 1.93 | 137,517 | |
| 7/13/2014 | 95.40 | 179.86 | 41.18 | 0.14 | 0.26 | 0.06 | 1.34 | 2.04 | 0.70 | 3.08 | 4.01 | 2.09 | 137,380 | |
| **Week:** | **95.01** | **179.86** | **31.07** | **0.14** | **0.26** | **0.04** | **1.36** | **2.04** | **0.58** | **3.06** | **4.48** | **1.93** | **957,710** | |

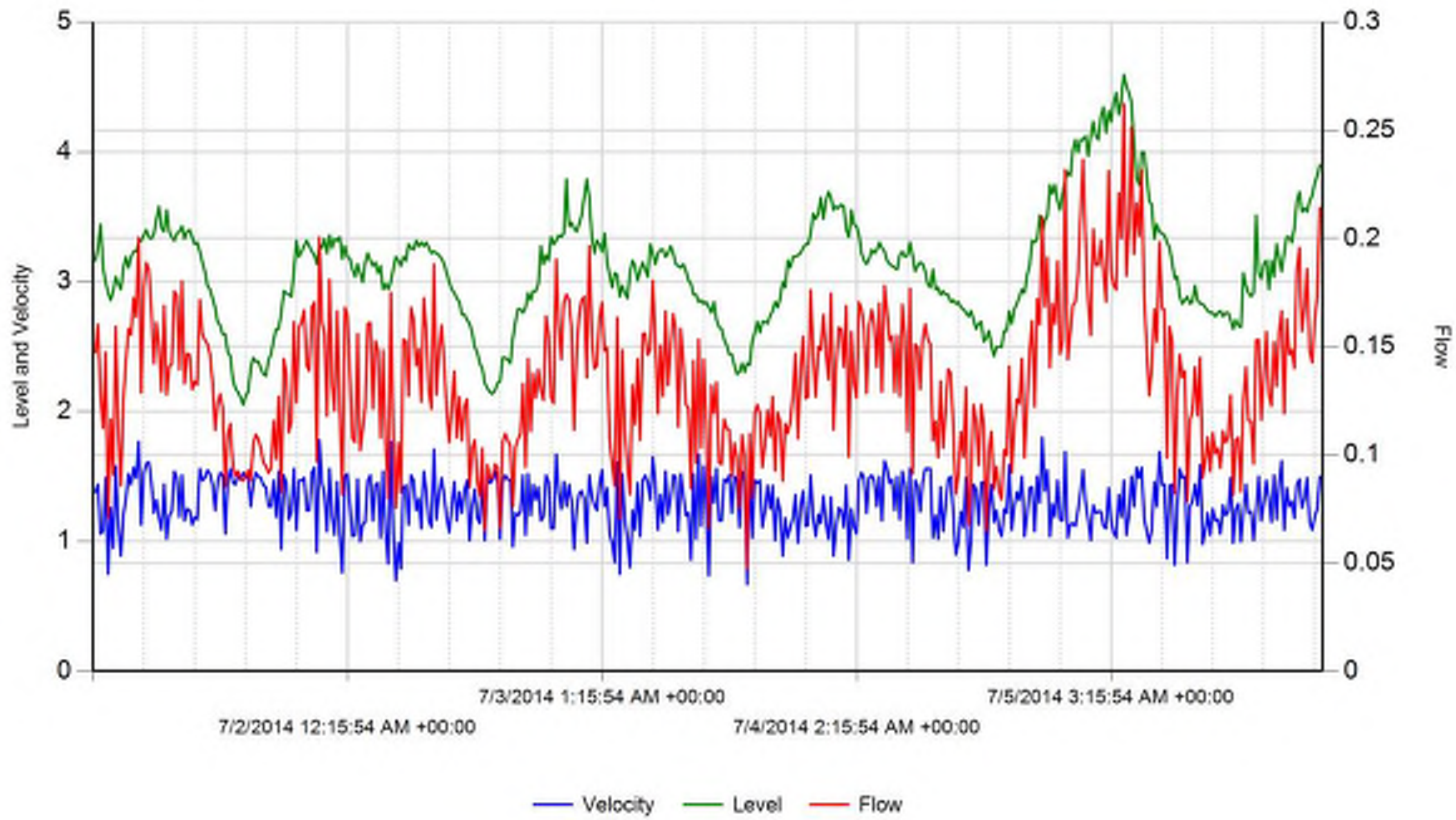
Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 370

# History for site 1 #134: 06/30/2014 thru 07/14/2014

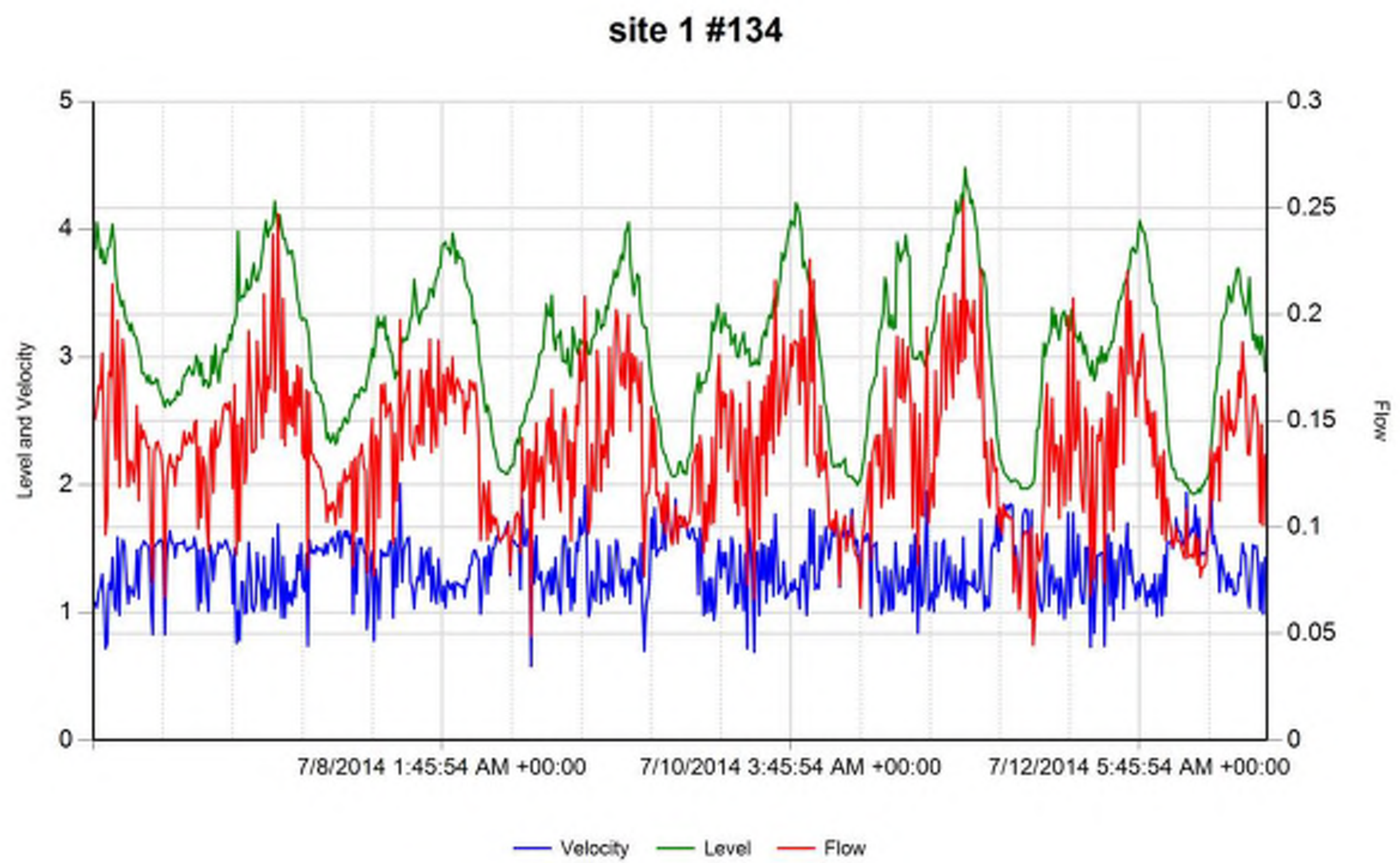
| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Total Gal** | **Rain** |
| 7/14/2014 | 80.46 | 137.30 | 52.62 | 0.12 | 0.20 | 0.08 | 1.38 | 1.71 | 0.72 | 2.74 | 4.04 | 1.91 | 115,859 | |
| **Week:** | **80.46** | **137.30** | **52.62** | **0.12** | **0.20** | **0.08** | **1.38** | **1.71** | **0.72** | **2.74** | **4.04** | **1.91** | **115,859** | |

# site 1 #134



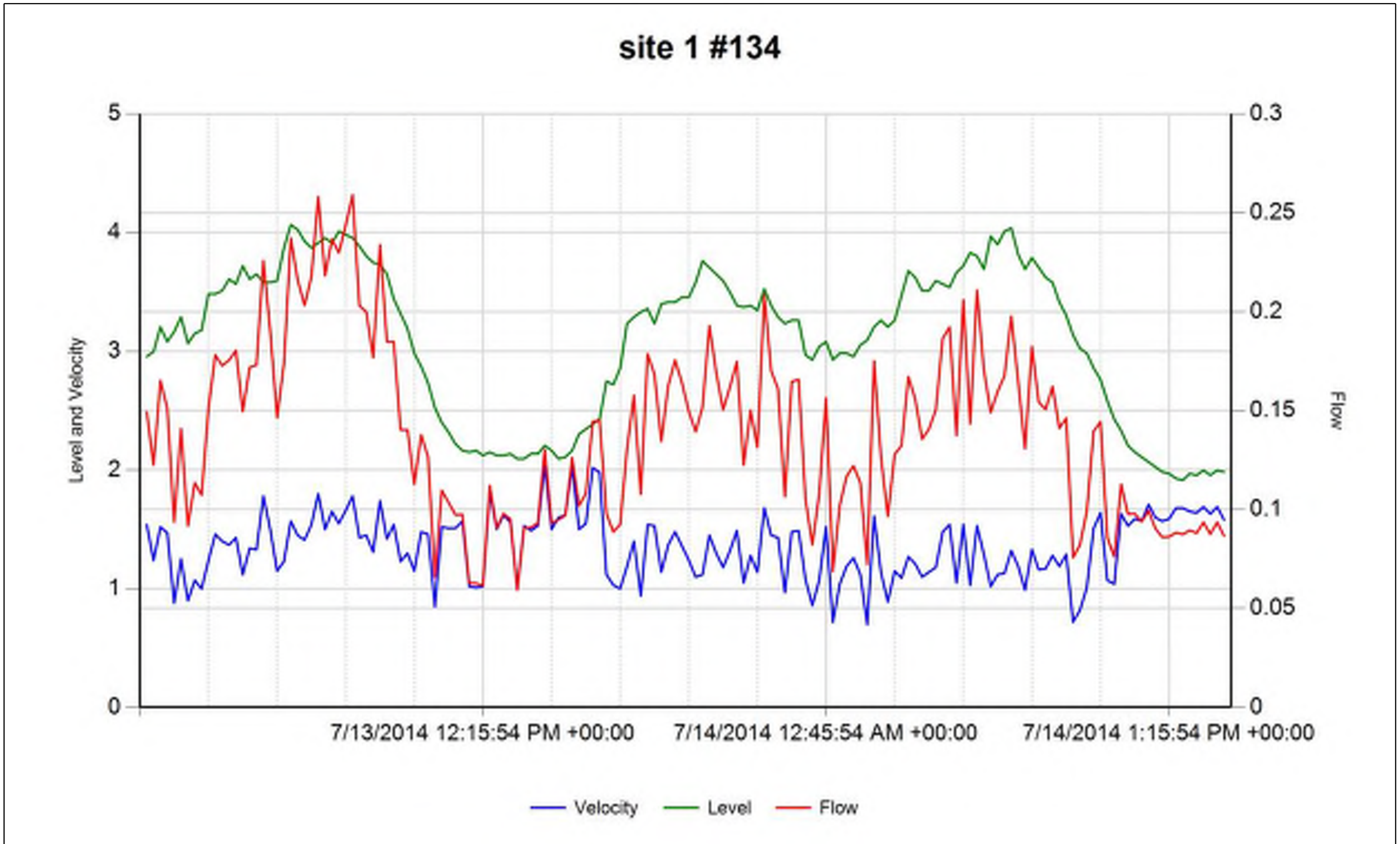

| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 1.293 | 3.111 | 0.135 | **RainFall** | Inches |
| Maximum | 1.799 | 4.594 | 0.262 | | |
| Minimum | 0.670 | 2.053 | 0.048 | | |

7/21/2014 3:59:25 PM



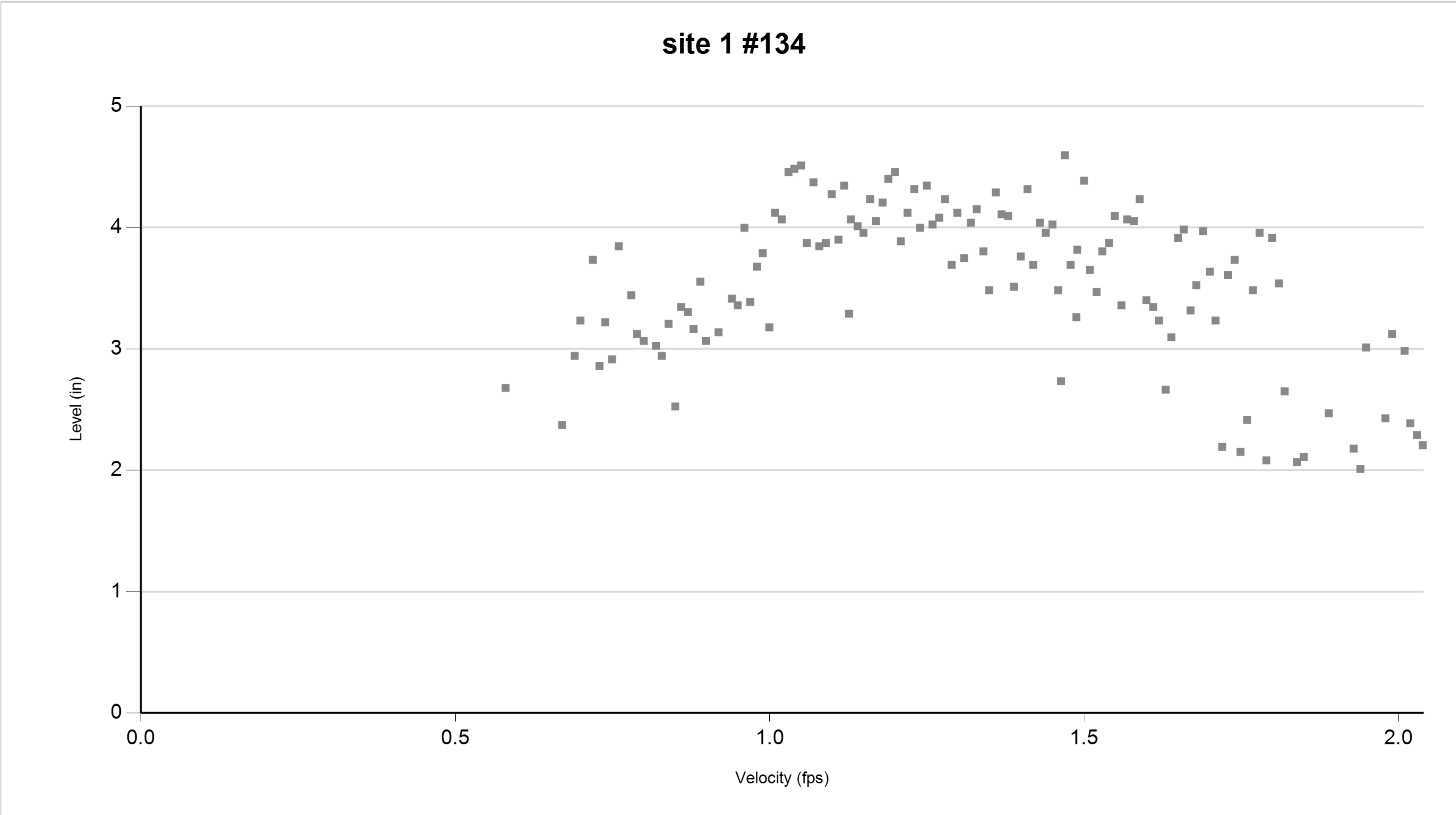

| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 1.354 | 3.077 | 0.137 | **RainFall** | Inches |
| Maximum | 2.029 | 4.483 | 0.254 | | |
| Minimum | 0.580 | 1.928 | 0.045 | | |

7/21/2014 3:59:25 PM




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 1.351 | 3.089 | 0.139 | **RainFall** | Inches |
| Maximum | 2.039 | 4.066 | 0.259 | | |
| Minimum | 0.699 | 1.914 | 0.059 | | |

7/21/2014 3:59:25 PM




6/30/2014 thru 7/14/2014

7/21/2014 3:59:25 PM

Site Report 07-21-2014

**Confidential Proprietary Information**

Breen Engineering

in parking lot due south of Marina pump station

site 2 #145

Manhole No.145

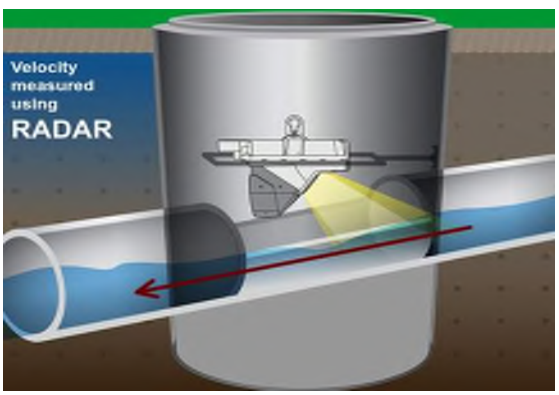
Access: manhole

System Type: Sanitary [X] Storm [ ]

Install Date: 6/30/2014

## Map


## Technology




## Traffic Plan

| Flow Meter | | | |
|---|---|---|---|
| Meter Depth ":10' | | | |
| Meter SN ":**** | | | |
| steady | | | |
| Avg Velocity | Avg Measured Level | Multiplier | |
| .86 | 3.25 | 1 | |
| **Gas** | | | |
| O2 | H2S | CO | LEL |
| 20.9 | 0 | 0 | 0 |
| **Notes** | | | |
| | | | |
| **Traffic Safety** | | | |
| cones | | | |
| **Land Use** | | | |
| Residential | Commercial | Industrial | Trunk |
| | | | |

| | |
|---|---|
| Manhole Depth " | 12' |
| Pipe Size " | 15" |
| Inner Pipe Size " (In/Out) | 15"/15" |
| Pipe Shape | Round |
| Pipe Condition | good |
| Manhole Material | lined |
| Silt (inches) | 0 |
| Velocity Profile Data | .82 |
| Velocity Profile Taken | 2-4-8 |
| Sensor Offset | 22.67 |
| Sensor Dist. to Crown | 7.67 |
| Flow Direction | Upstream |
| Flow Heading | North |

Meter Site Document

Breen Engineering

site 2 #145

in parking lot due south of Marina pump station

Site

Manhole Before Install

Installation Process

Installed

Upstream

Downstream

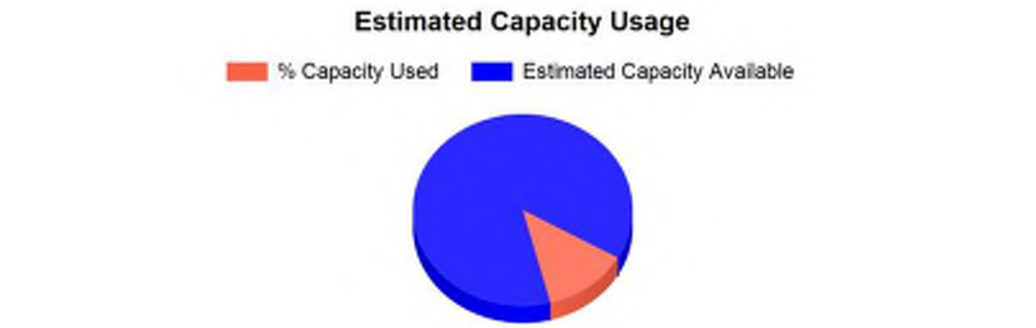
# Temporary Flow Study

## Breen Engineering

site 2 #145

| | | |
|---|---|---|
| Meter Start Date | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | To | 7/14/2014 12:00:00 AM |

| Velocity (fps) | | Level (in) | Flow (mgd) |
|---|---|---|---|
| Average | 0.921 | 2.651 | 0.089 |
| Maximum | 1.729 | 3.580 | 0.233 |
| Minimum | 0.490 | 0.206 | 0.001 |
| Pipe Size | | 15.000 | |
| Estimated Capacity (mgd) | | 1.847 | |
| Capacity Used | | 12.61 % | |
| Sensor Type | | Hach - Flodar | |




**Utility Systems, Science and Software**

**6190 Fairmount Ave. Suite E**
**San Diego, CA 92021**

**601 N. Parkcenter Drive Suite 209**
**Santa Ana, CA 92705**

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 371

# History for site 2 #145: 06/30/2014 thru 07/14/2014

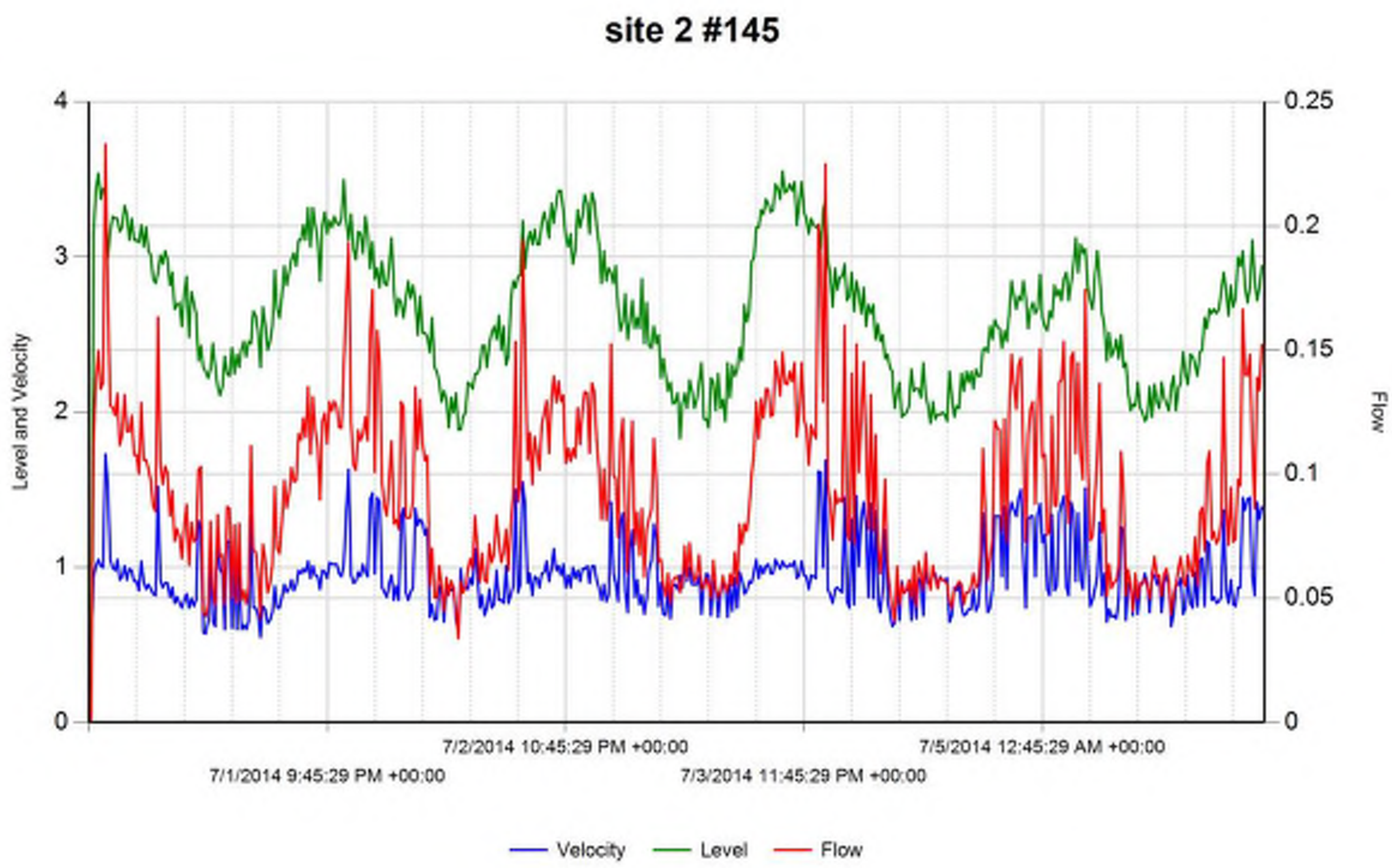
| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| 6/30/2014 | 77.24 | 161.74 | 0.73 | 0.11 | 0.23 | 0.00 | 0.95 | 1.73 | 0.49 | 3.01 | 3.54 | 0.21 | 111,228 | |
| 7/1/2014 | 65.71 | 134.18 | 29.12 | 0.09 | 0.19 | 0.04 | 0.92 | 1.63 | 0.55 | 2.78 | 3.50 | 2.11 | 94,618 | |
| 7/2/2014 | 65.12 | 134.90 | 23.51 | 0.09 | 0.19 | 0.03 | 0.94 | 1.55 | 0.59 | 2.72 | 3.43 | 1.89 | 93,770 | |
| 7/3/2014 | 66.37 | 156.20 | 33.35 | 0.10 | 0.22 | 0.05 | 0.96 | 1.69 | 0.67 | 2.70 | 3.55 | 1.83 | 95,566 | |
| 7/4/2014 | 59.81 | 121.10 | 28.37 | 0.09 | 0.17 | 0.04 | 0.99 | 1.51 | 0.62 | 2.45 | 3.12 | 1.93 | 86,131 | |
| 7/5/2014 | 58.44 | 115.57 | 30.27 | 0.08 | 0.17 | 0.04 | 0.94 | 1.48 | 0.62 | 2.52 | 3.11 | 1.94 | 84,147 | |
| 7/6/2014 | 56.02 | 108.06 | 28.67 | 0.08 | 0.16 | 0.04 | 0.93 | 1.50 | 0.66 | 2.46 | 3.08 | 1.91 | 80,673 | |
| **Week:** | **64.10** | **161.74** | **0.73** | **0.09** | **0.23** | **0.00** | **0.95** | **1.73** | **0.49** | **2.66** | **3.55** | **0.21** | **646,134** | |
| 7/7/2014 | 66.46 | 131.61 | 23.82 | 0.10 | 0.19 | 0.03 | 0.93 | 1.62 | 0.55 | 2.76 | 3.46 | 1.89 | 95,701 | |
| 7/8/2014 | 64.09 | 109.68 | 31.95 | 0.09 | 0.16 | 0.05 | 0.91 | 1.56 | 0.66 | 2.75 | 3.58 | 2.01 | 92,286 | |
| 7/9/2014 | 65.40 | 123.48 | 30.08 | 0.09 | 0.18 | 0.04 | 0.91 | 1.55 | 0.63 | 2.78 | 3.51 | 2.11 | 94,177 | |
| 7/10/2014 | 59.35 | 124.98 | 26.53 | 0.09 | 0.18 | 0.04 | 0.86 | 1.49 | 0.54 | 2.68 | 3.36 | 1.91 | 85,463 | |
| 7/11/2014 | 63.13 | 110.30 | 29.15 | 0.09 | 0.16 | 0.04 | 0.87 | 1.50 | 0.61 | 2.78 | 3.46 | 2.11 | 90,913 | |
| 7/12/2014 | 57.11 | 121.10 | 28.65 | 0.08 | 0.17 | 0.04 | 0.90 | 1.51 | 0.58 | 2.55 | 3.05 | 1.93 | 82,236 | |
| 7/13/2014 | 51.27 | 112.52 | 21.05 | 0.07 | 0.16 | 0.03 | 0.89 | 1.51 | 0.51 | 2.39 | 2.90 | 1.82 | 73,835 | |
| **Week:** | **60.97** | **131.61** | **21.05** | **0.09** | **0.19** | **0.03** | **0.90** | **1.62** | **0.51** | **2.67** | **3.58** | **1.82** | **614,611** | |

Utility Systems  Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 371

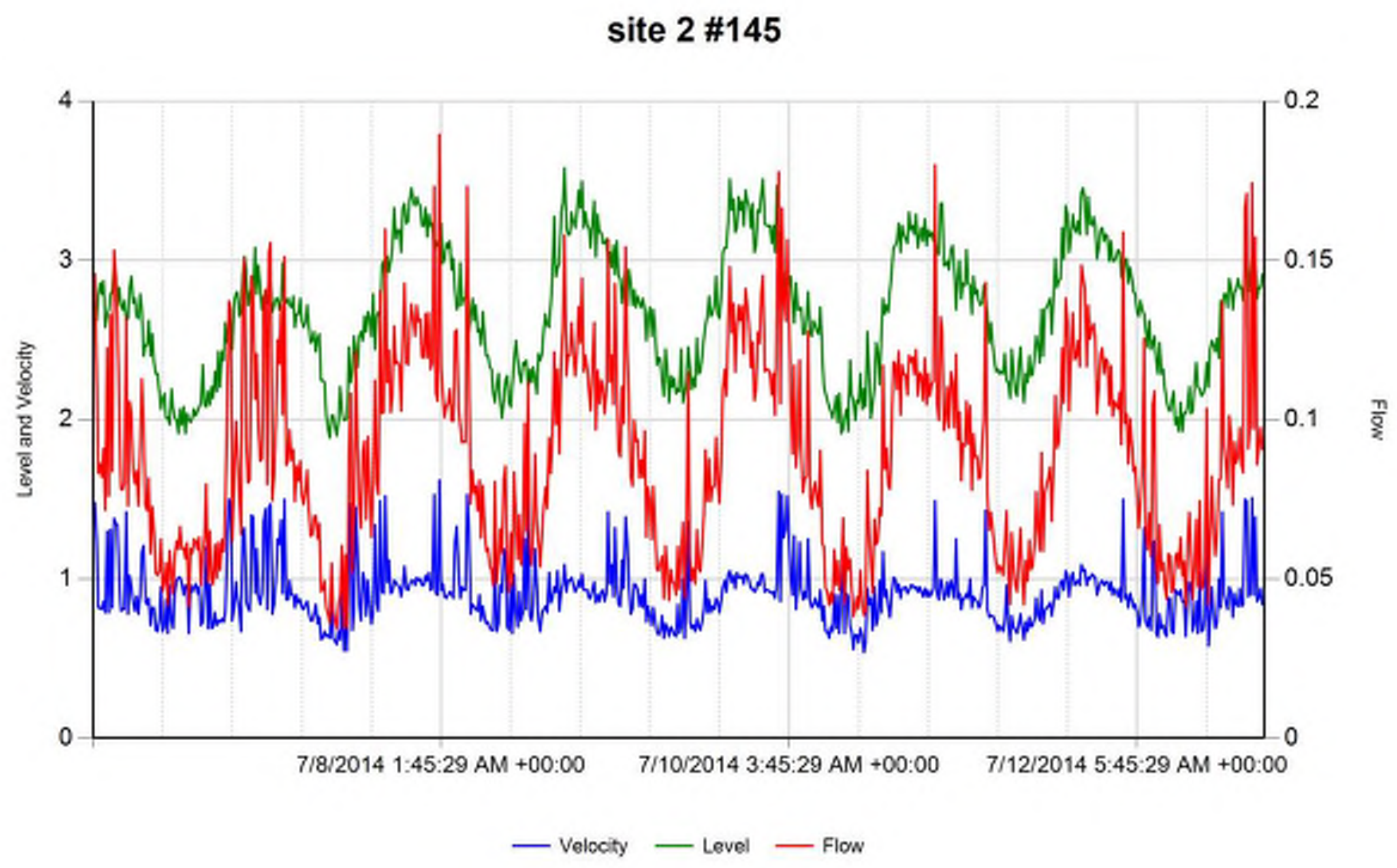
# History for site 2 #145: 06/30/2014 thru 07/14/2014

| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| 7/14/2014 | 38.17 | 68.62 | 26.88 | 0.05 | 0.10 | 0.04 | 0.80 | 1.19 | 0.58 | 2.14 | 2.43 | 1.82 | 54,960 | |
| **Week:** | **38.17** | **68.62** | **26.88** | **0.05** | **0.10** | **0.04** | **0.80** | **1.19** | **0.58** | **2.14** | **2.43** | **1.82** | **54,960** | |




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.947 | 2.658 | 0.092 | **RainFall** | Inches |
| Maximum | 1.729 | 3.553 | 0.233 | | |
| Minimum | 0.490 | 0.206 | 0.001 | | |

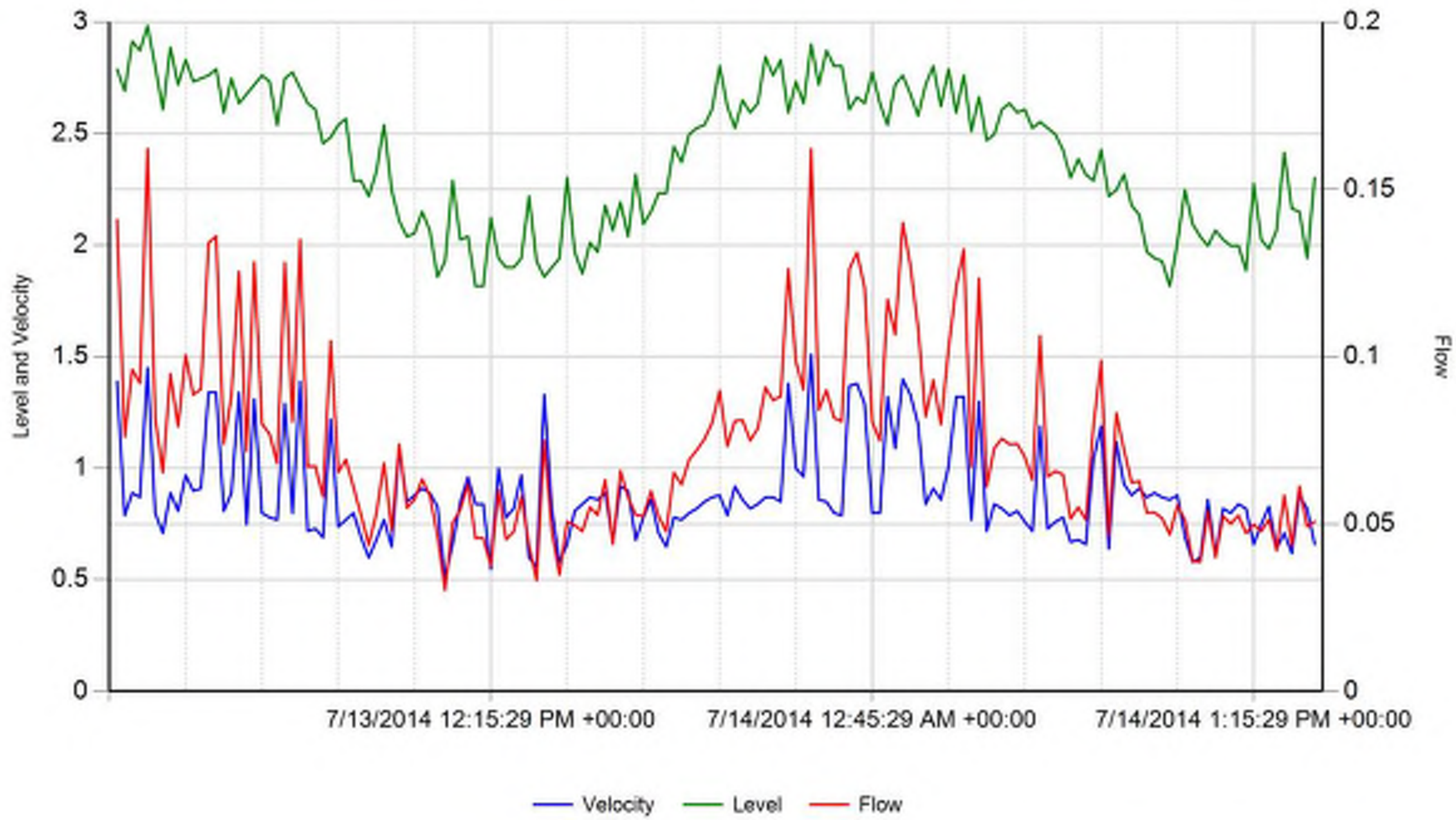
7/21/2014 4:00:17 PM




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.905 | 2.680 | 0.089 | **RainFall** | Inches |
| Maximum | 1.619 | 3.580 | 0.190 | | |
| Minimum | 0.539 | 1.886 | 0.034 | | |

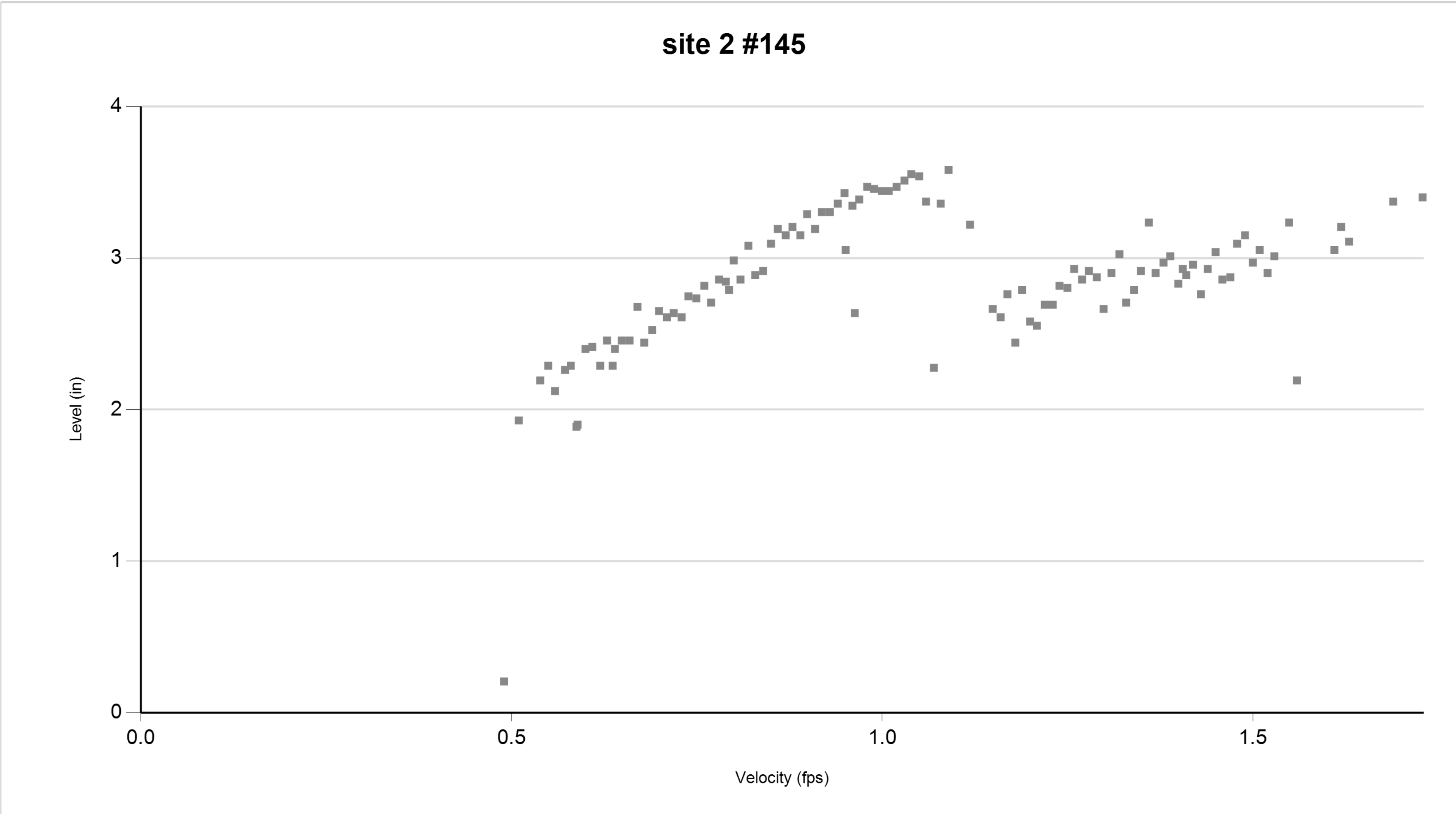
7/21/2014 4:00:17 PM

site 2 #145




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.882 | 2.398 | 0.074 | **RainFall** | Inches |
| Maximum | 1.509 | 2.983 | 0.162 | | |
| Minimum | 0.510 | 1.817 | 0.030 | | |

7/21/2014 4:00:17 PM




6/30/2014 thru 7/14/2014

7/21/2014 4:00:17 PM

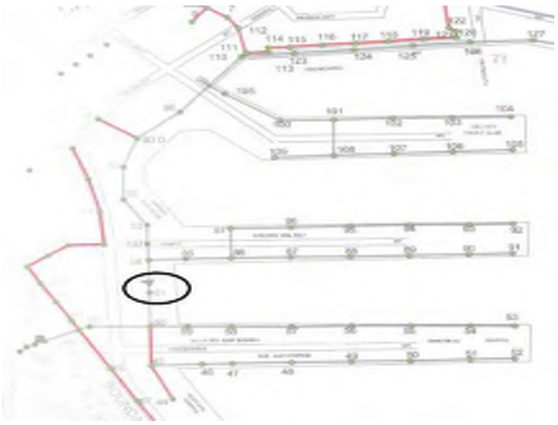
Site Report 07-21-2014

**Confidential Proprietary Information**

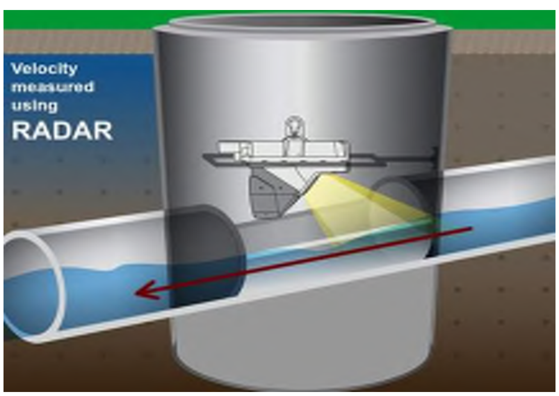
| | |
|---|---|
| Breen Engineering | Panay way |
| site 3 #61 | Manhole No.61 |

| | | |
|---|---|---|
| Access: manhole | System Type: Sanitary [X] Storm [ ] | Install Date: 6/30/2014 |

Map



Technology




Traffic Plan

| Flow Meter | | | |
|---|---|---|---|
| Meter Depth ":16' | | | |
| Meter SN ":***** | | | |
| good steady | | | |
| Avg Velocity | Avg Measured Level | Multiplier | |
| 1.39 | 6.5 | 1 | |

| Gas | | | |
|---|---|---|---|
| O2 | H2S | CO | LEL |
| 20.9 | 0 | 0 | 0 |

**Notes**

in apt complex

**Traffic Safety**

cones

**Land Use**

| Residential | Commercial | Industrial | Trunk |
|---|---|---|---|
| | X | | |

| | |
|---|---|
| Manhole Depth " | 19' |
| Pipe Size " | 15" |
| Inner Pipe Size " (In/Out) | 15"/15" |
| Pipe Shape | Round |
| Pipe Condition | good |
| Manhole Material | lined |
| Silt (inches) | 0 |
| Velocity Profile Data | 1.34 |
| Velocity Profile Taken | 2-4-8 |
| Sensor Offset | 22.67 |
| Sensor Dist. to Crown | 7.67 |
| Flow Direction | Upstream |
| Flow Heading | South |

Meter Site Document

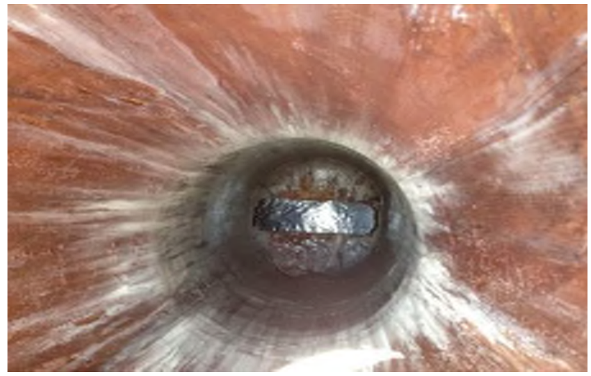
Breen Engineering

site 3 #61

Panay way

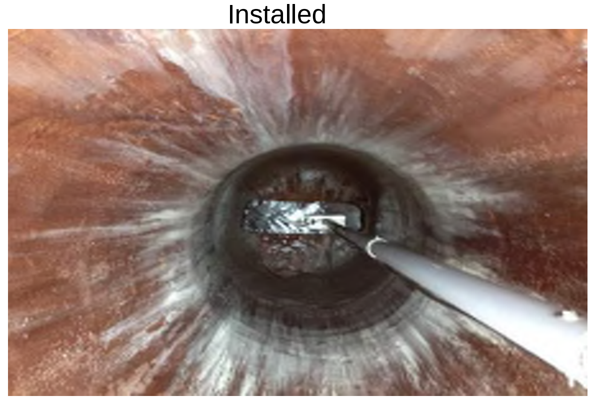
Site

Manhole Before Install



Installation Process

Installed



Upstream

Downstream

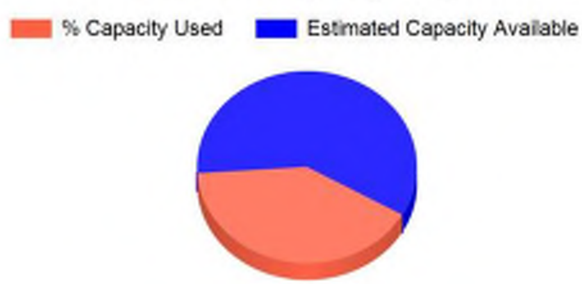
# Temporary Flow Study

## Breen Engineering

site 3 #61

| | | |
|---|---|---|
| Meter Start Date | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | Level (in) | Flow (mgd) |
| Average 1.332 | 6.431 | 0.448 |
| Maximum 1.709 | 8.399 | 0.750 |
| Minimum 0.569 | 3.206 | 0.081 |
| Pipe Size | 15.000 | |
| Estimated Capacity (mgd) | 1.847 | |
| Capacity Used | 40.60 % | |
| Sensor Type | Hach - Flodar | |

**Estimated Capacity Usage**




**Utility Systems, Science and Software**

**6190 Fairmount Ave. Suite E**
**San Diego, CA 92021**

**601 N. Parkcenter Drive Suite 209**
**Santa Ana, CA 92705**

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 372

# History for site 3 #61: 06/30/2014 thru 07/14/2014

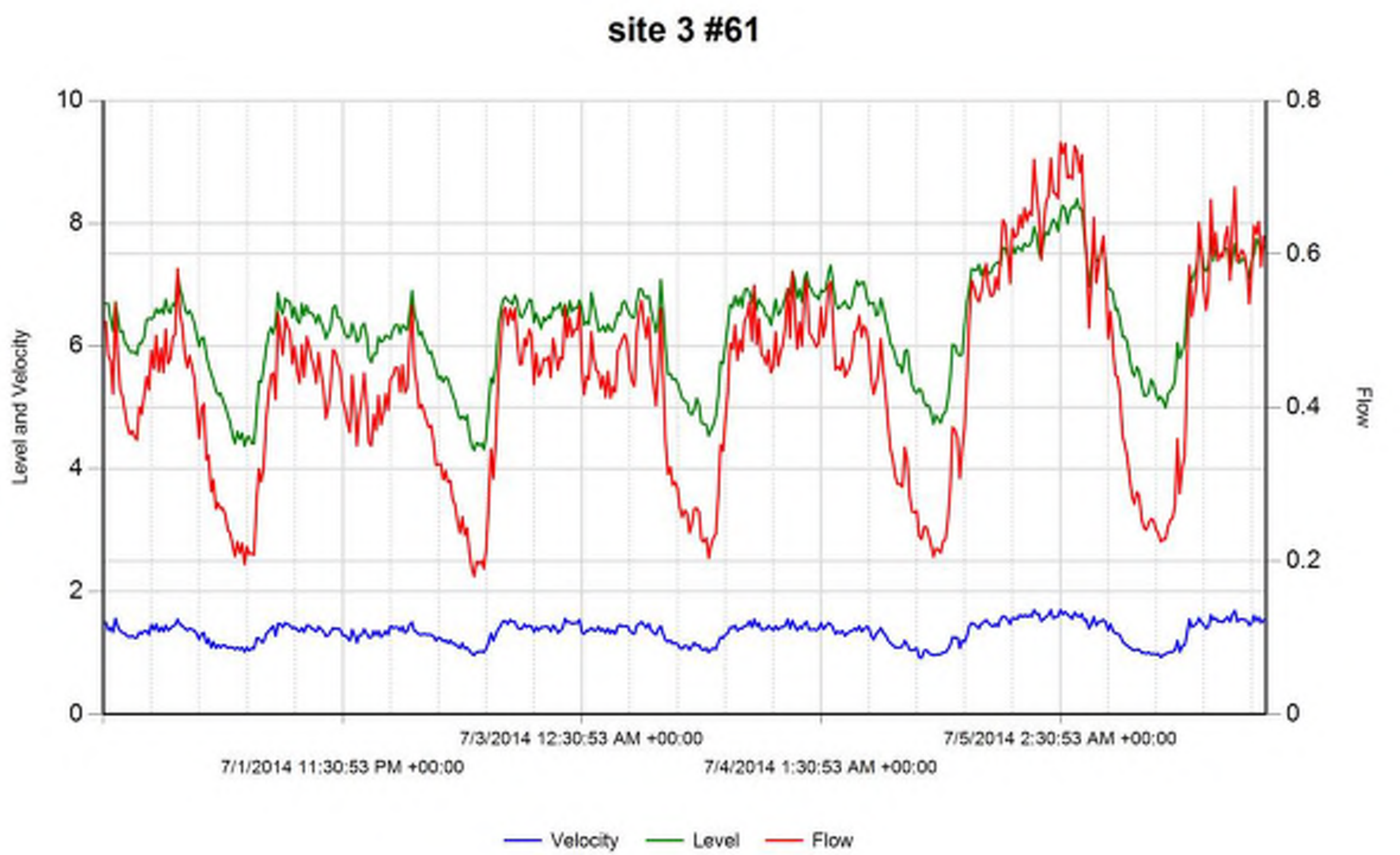
| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Avg** | **Max** | **Min** | **Total Gal** | **Rain** |
| 6/30/2014 | 311.54 | 403.36 | 248.50 | 0.45 | 0.58 | 0.36 | 1.38 | 1.56 | 1.25 | 6.42 | 7.19 | 5.86 | 448,617 | |
| 7/1/2014 | 269.37 | 370.27 | 135.82 | 0.39 | 0.53 | 0.20 | 1.30 | 1.50 | 1.02 | 5.98 | 6.90 | 4.37 | 387,894 | |
| 7/2/2014 | 283.92 | 374.48 | 125.07 | 0.41 | 0.54 | 0.18 | 1.33 | 1.56 | 0.96 | 6.09 | 6.93 | 4.30 | 408,845 | |
| 7/3/2014 | 299.34 | 400.18 | 141.56 | 0.43 | 0.58 | 0.20 | 1.33 | 1.55 | 1.01 | 6.34 | 7.32 | 4.54 | 431,053 | |
| 7/4/2014 | 346.09 | 517.53 | 142.76 | 0.50 | 0.75 | 0.21 | 1.37 | 1.70 | 0.92 | 6.82 | 8.40 | 4.73 | 498,374 | |
| 7/5/2014 | 339.53 | 477.13 | 156.34 | 0.49 | 0.69 | 0.23 | 1.35 | 1.69 | 0.93 | 6.85 | 7.94 | 5.00 | 488,922 | |
| 7/6/2014 | 335.89 | 461.73 | 172.08 | 0.48 | 0.66 | 0.25 | 1.31 | 1.54 | 0.98 | 6.99 | 8.18 | 5.34 | 483,683 | |
| **Week:** | **312.24** | **517.53** | **125.07** | **0.45** | **0.75** | **0.18** | **1.34** | **1.70** | **0.92** | **6.50** | **8.40** | **4.30** | **3,147,390** | |
| 7/7/2014 | 316.83 | 472.67 | 149.98 | 0.46 | 0.68 | 0.22 | 1.35 | 1.63 | 0.97 | 6.51 | 8.05 | 4.73 | 456,239 | |
| 7/8/2014 | 297.58 | 478.01 | 96.00 | 0.43 | 0.69 | 0.14 | 1.35 | 1.67 | 0.89 | 6.14 | 7.75 | 3.76 | 428,513 | |
| 7/9/2014 | 304.75 | 498.56 | 91.24 | 0.44 | 0.72 | 0.13 | 1.34 | 1.66 | 0.85 | 6.26 | 8.05 | 3.69 | 438,842 | |
| 7/10/2014 | 299.77 | 462.05 | 67.54 | 0.43 | 0.67 | 0.10 | 1.30 | 1.63 | 0.69 | 6.25 | 7.84 | 3.47 | 431,669 | |
| 7/11/2014 | 299.53 | 474.94 | 56.03 | 0.43 | 0.68 | 0.08 | 1.30 | 1.69 | 0.57 | 6.19 | 7.84 | 3.21 | 431,318 | |
| 7/12/2014 | 321.16 | 494.90 | 67.15 | 0.46 | 0.71 | 0.10 | 1.34 | 1.71 | 0.71 | 6.43 | 8.19 | 3.40 | 462,467 | |
| 7/13/2014 | 330.79 | 520.82 | 72.51 | 0.48 | 0.75 | 0.10 | 1.32 | 1.69 | 0.68 | 6.74 | 8.29 | 3.68 | 476,334 | |

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 372

# History for site 3 #61: 06/30/2014 thru 07/14/2014

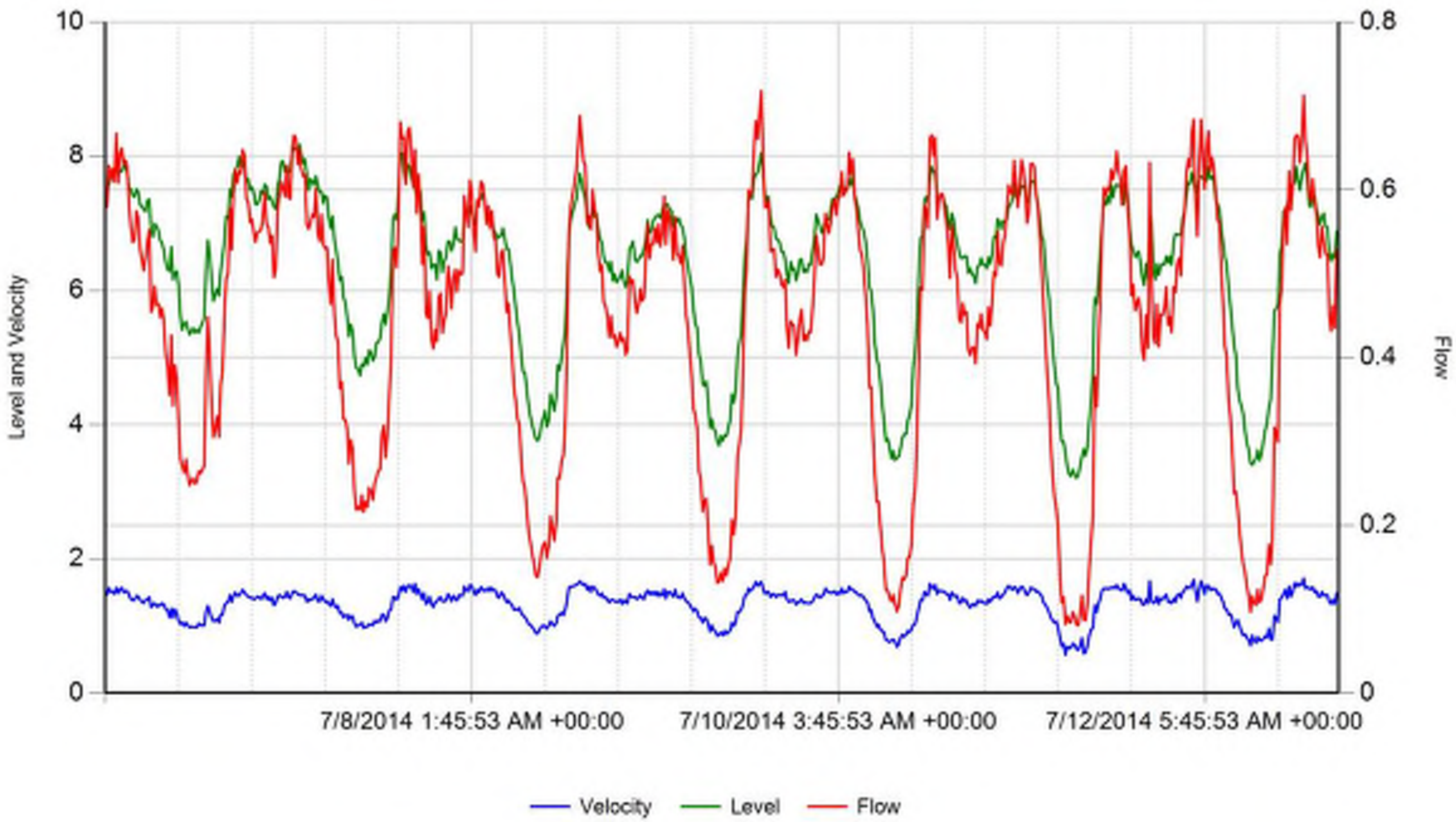
| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| **Week:** | **310.06** | **520.82** | **56.03** | **0.45** | **0.75** | **0.08** | **1.33** | **1.71** | **0.57** | **6.36** | **8.29** | **3.21** | **3,125,382** | |
| 7/14/2014 | 215.88 | 410.12 | 76.25 | 0.31 | 0.59 | 0.11 | 1.06 | 1.41 | 0.75 | 5.65 | 7.90 | 3.61 | 310,862 | |
| **Week:** | **215.88** | **410.12** | **76.25** | **0.31** | **0.59** | **0.11** | **1.06** | **1.41** | **0.75** | **5.65** | **7.90** | **3.61** | **310,862** | |




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 1.334 | 6.358 | 0.436 | **RainFall** | Inches |
| Maximum | 1.700 | 8.399 | 0.745 | | |
| Minimum | 0.919 | 4.302 | 0.180 | | |

7/21/2014 4:03:58 PM

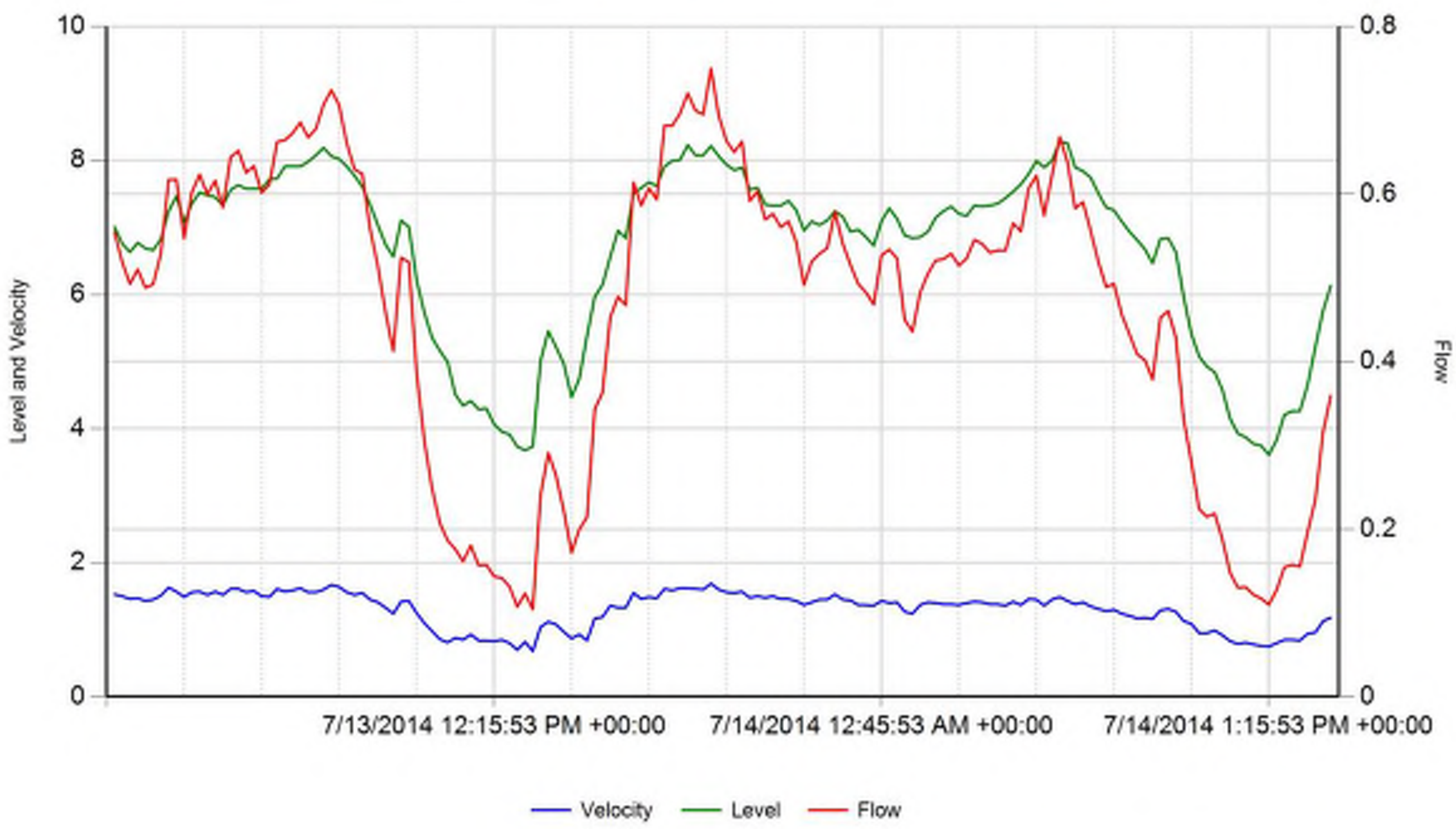
# site 3 #61




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 1.323 | 6.398 | 0.446 | **RainFall** | Inches |
| Maximum | 1.709 | 8.177 | 0.718 | | |
| Minimum | 0.569 | 3.206 | 0.081 | | |

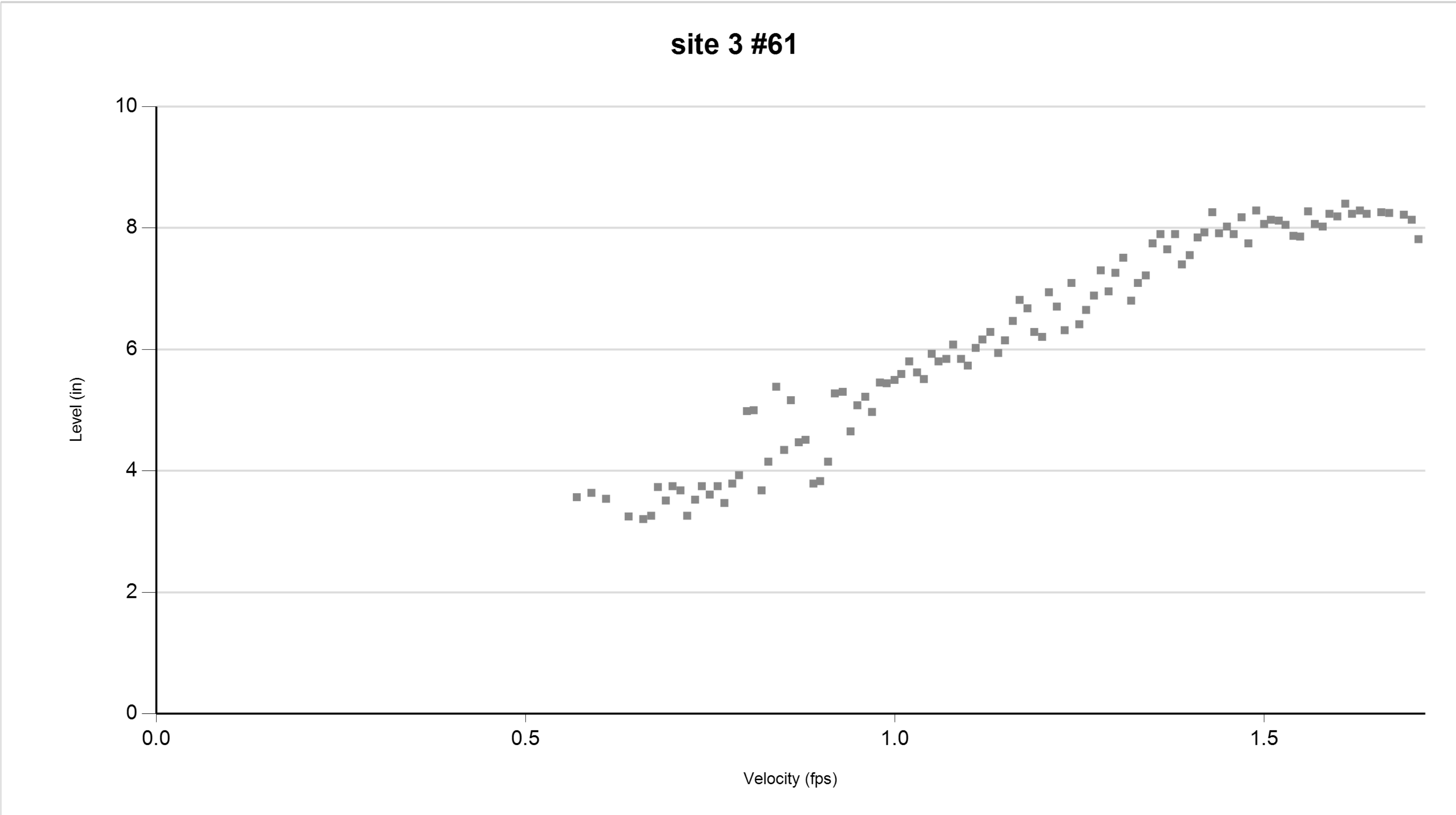
7/21/2014 4:03:58 PM

## site 3 #61




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 1.302 | 6.627 | 0.463 | **RainFall** | Inches |
| Maximum | 1.689 | 8.288 | 0.750 | | |
| Minimum | 0.679 | 3.608 | 0.104 | | |

7/21/2014 4:03:58 PM




6/30/2014 thru 7/14/2014

7/21/2014 4:03:58 PM

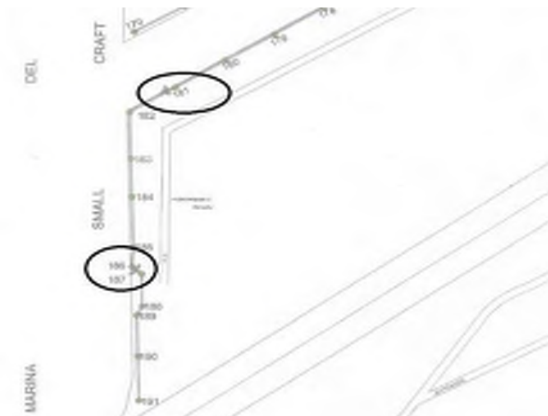
Site Report 07-21-2014

**Confidential Proprietary Information**

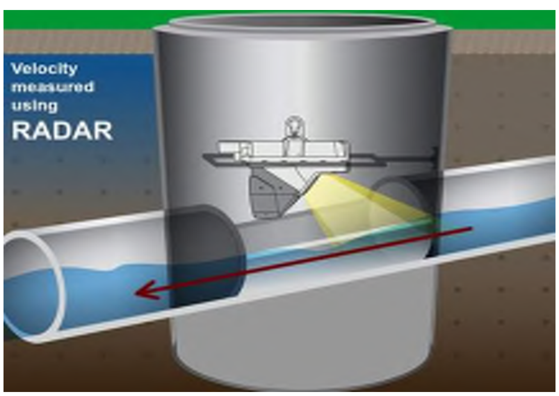
| | | |
|---|---|---|
| | Breen Engineering | behind Whisky Reds restaurant |
| site 4 #186 | | Manhole No.186 |

| | | |
|---|---|---|
| Access: manhole | System Type: Sanitary [X] Storm [ ] | Install Date: 6/30/2014 |

Map




Technology




Traffic Plan

## Flow Meter

Meter Depth ":4'

Meter SN ":*****

good

| Avg Velocity | Avg Measured Level | Multiplier |
|---|---|---|
| .54 | 2.50 | 1 |

## Gas

| O2 | H2S | CO | LEL |
|---|---|---|---|
| 20.9 | 0 | 0 | 0 |

## Notes

in sidewalk behind restaurant, up stream and down stream pics are showing a back-up in the system

## Traffic Safety

cones

## Land Use

| Residential | Commercial | Industrial | Trunk |
|---|---|---|---|
| | X | | |

| | |
|---|---|
| Manhole Depth " | 6' |
| Pipe Size " | 10" |
| Inner Pipe Size " (In/Out) | 10"/10" |
| Pipe Shape | Round |
| Pipe Condition | good |
| Manhole Material | concrete |
| Silt (inches) | 0 |
| Velocity Profile Data | .49 |
| Velocity Profile Taken | |
| Sensor Offset | 17.41 |
| Sensor Dist. to Crown | 7.41 |
| Flow Direction | Upstream |
| Flow Heading | East |

Meter Site Document

Breen Engineering

site 4 #186

behind Whisky Reds restaurant

Site

Manhole Before Install

Installation Process

Installed

Upstream

Downstream

# Temporary Flow Study

## Breen Engineering

site 4 #186

| | | |
|---|---|---|
| Meter Start Date | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | To | 7/14/2014 12:00:00 AM |

| Velocity (fps) | | Level (in) | Flow (mgd) |
|---|---|---|---|
| Average | 0.506 | 2.800 | 0.044 |
| Maximum | 2.320 | 6.520 | 0.396 |
| Minimum | 0.000 | 1.030 | 0.000 |
| Pipe Size | | 10.000 | |
| Estimated Capacity (mgd) | | 0.667 | |
| Capacity Used | | 59.32 % | |
| Sensor Type | | Hach - Flodar | |


**Utility Systems, Science and Software**

**6190 Fairmount Ave. Suite E**
**San Diego, CA 92021**

**601 N. Parkcenter Drive Suite 209**
**Santa Ana, CA 92705**

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 373

# History for site 4 #186: 06/30/2014 thru 07/14/2014

| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| 6/30/2014 | 22.91 | 70.91 | 0.00 | 0.03 | 0.10 | 0.00 | 0.53 | 1.63 | 0.00 | 2.34 | 2.68 | 2.00 | 32,995 | |
| 7/1/2014 | 20.21 | 38.04 | 0.00 | 0.03 | 0.05 | 0.00 | 0.46 | 0.70 | 0.00 | 2.27 | 2.89 | 1.41 | 29,096 | |
| 7/2/2014 | 25.06 | 72.05 | 0.00 | 0.04 | 0.10 | 0.00 | 0.59 | 1.50 | 0.00 | 2.37 | 3.12 | 1.83 | 36,087 | |
| 7/3/2014 | 19.62 | 49.85 | 0.00 | 0.03 | 0.07 | 0.00 | 0.43 | 1.16 | 0.00 | 2.34 | 3.15 | 1.25 | 28,252 | |
| 7/4/2014 | 24.16 | 49.85 | 0.00 | 0.03 | 0.07 | 0.00 | 0.50 | 1.16 | 0.00 | 2.43 | 3.09 | 1.72 | 34,785 | |
| 7/5/2014 | 20.07 | 44.82 | 0.00 | 0.03 | 0.06 | 0.00 | 0.46 | 1.00 | 0.00 | 2.25 | 3.00 | 1.44 | 28,907 | |
| 7/6/2014 | 24.90 | 54.38 | 0.00 | 0.04 | 0.08 | 0.00 | 0.58 | 1.41 | 0.00 | 2.33 | 3.05 | 1.53 | 35,859 | |
| **Week:** | **22.42** | **72.05** | **0.00** | **0.03** | **0.10** | **0.00** | **0.51** | **1.63** | **0.00** | **2.33** | **3.15** | **1.25** | **225,981** | |
| 7/7/2014 | 17.94 | 36.04 | 0.00 | 0.03 | 0.05 | 0.00 | 0.41 | 0.67 | 0.00 | 2.21 | 3.00 | 1.22 | 25,831 | |
| 7/8/2014 | 19.72 | 74.29 | 0.00 | 0.03 | 0.11 | 0.00 | 0.45 | 1.75 | 0.00 | 2.18 | 3.23 | 1.29 | 28,390 | |
| 7/9/2014 | 27.07 | 83.11 | 0.00 | 0.04 | 0.12 | 0.00 | 0.62 | 1.74 | 0.00 | 2.21 | 3.18 | 1.46 | 38,986 | |
| 7/10/2014 | 31.61 | 274.86 | 0.00 | 0.05 | 0.40 | 0.00 | 0.65 | 2.32 | 0.00 | 2.10 | 5.00 | 1.19 | 45,517 | |
| 7/11/2014 | 22.96 | 115.14 | 0.00 | 0.03 | 0.17 | 0.00 | 0.43 | 1.86 | 0.00 | 2.43 | 5.98 | 1.03 | 33,069 | |
| 7/12/2014 | 71.09 | 114.62 | 4.84 | 0.10 | 0.17 | 0.01 | 0.48 | 0.84 | 0.04 | 5.78 | 6.41 | 4.87 | 102,370 | |
| 7/13/2014 | 73.81 | 177.14 | 4.86 | 0.11 | 0.26 | 0.01 | 0.50 | 1.05 | 0.04 | 5.67 | 6.52 | 4.69 | 106,291 | |
| **Week:** | **37.74** | **274.86** | **0.00** | **0.05** | **0.40** | **0.00** | **0.51** | **2.32** | **0.00** | **3.22** | **6.52** | **1.03** | **380,453** | |

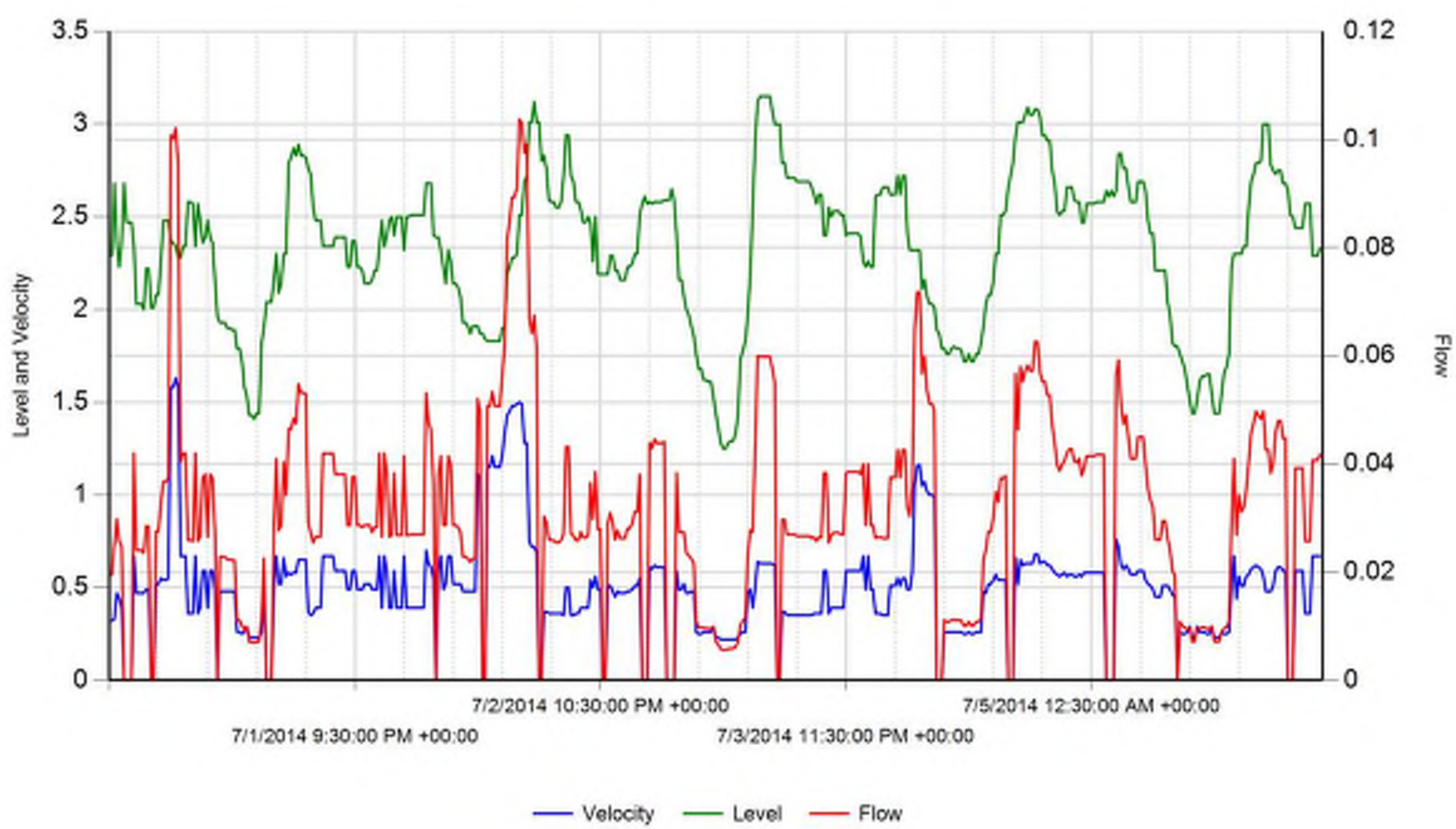
Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 373

# History for site 4 #186: 06/30/2014 thru 07/14/2014

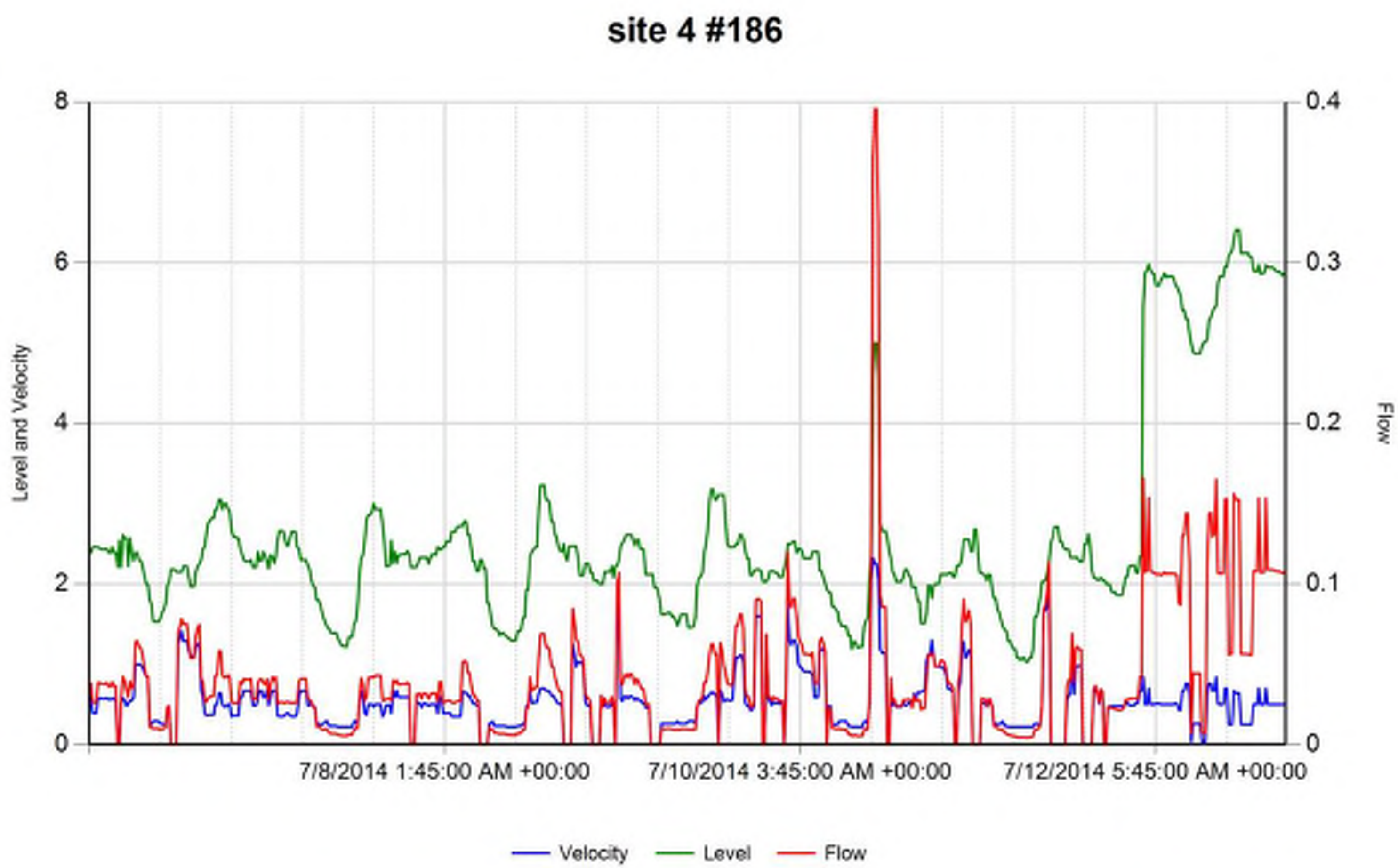
| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| 7/14/2014 | 55.20 | 178.17 | 0.00 | 0.08 | 0.26 | 0.00 | 0.42 | 1.15 | 0.00 | 5.04 | 6.07 | 4.48 | 79,483 | |
| **Week:** | **55.20** | **178.17** | **0.00** | **0.08** | **0.26** | **0.00** | **0.42** | **1.15** | **0.00** | **5.04** | **6.07** | **4.48** | **79,483** | |

## site 4 #186



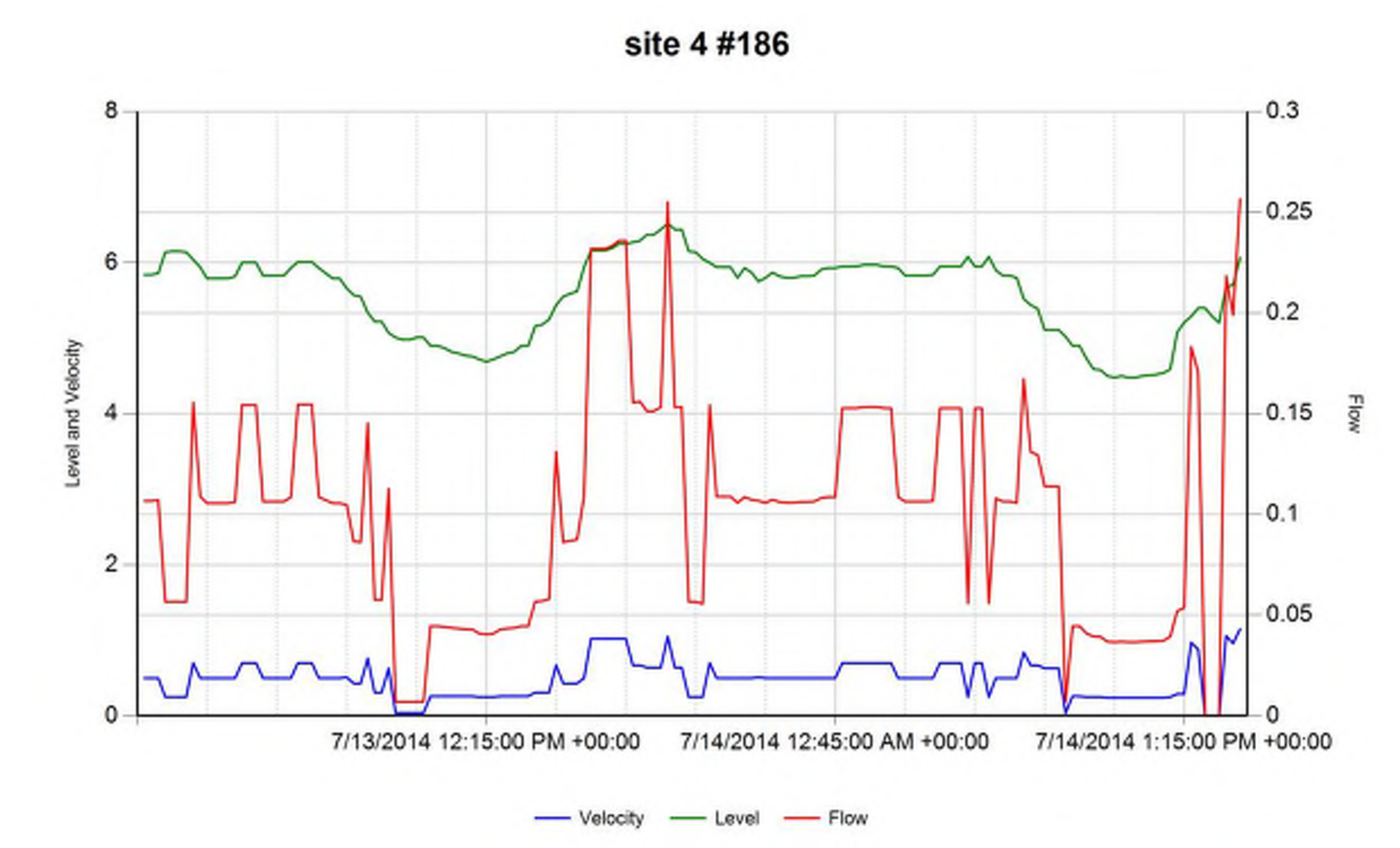

| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.487 | 2.328 | 0.031 | **RainFall** | Inches |
| Maximum | 1.630 | 3.150 | 0.104 | | |
| Minimum | 0.000 | 1.250 | 0.000 | | |

7/21/2014 4:04:52 PM

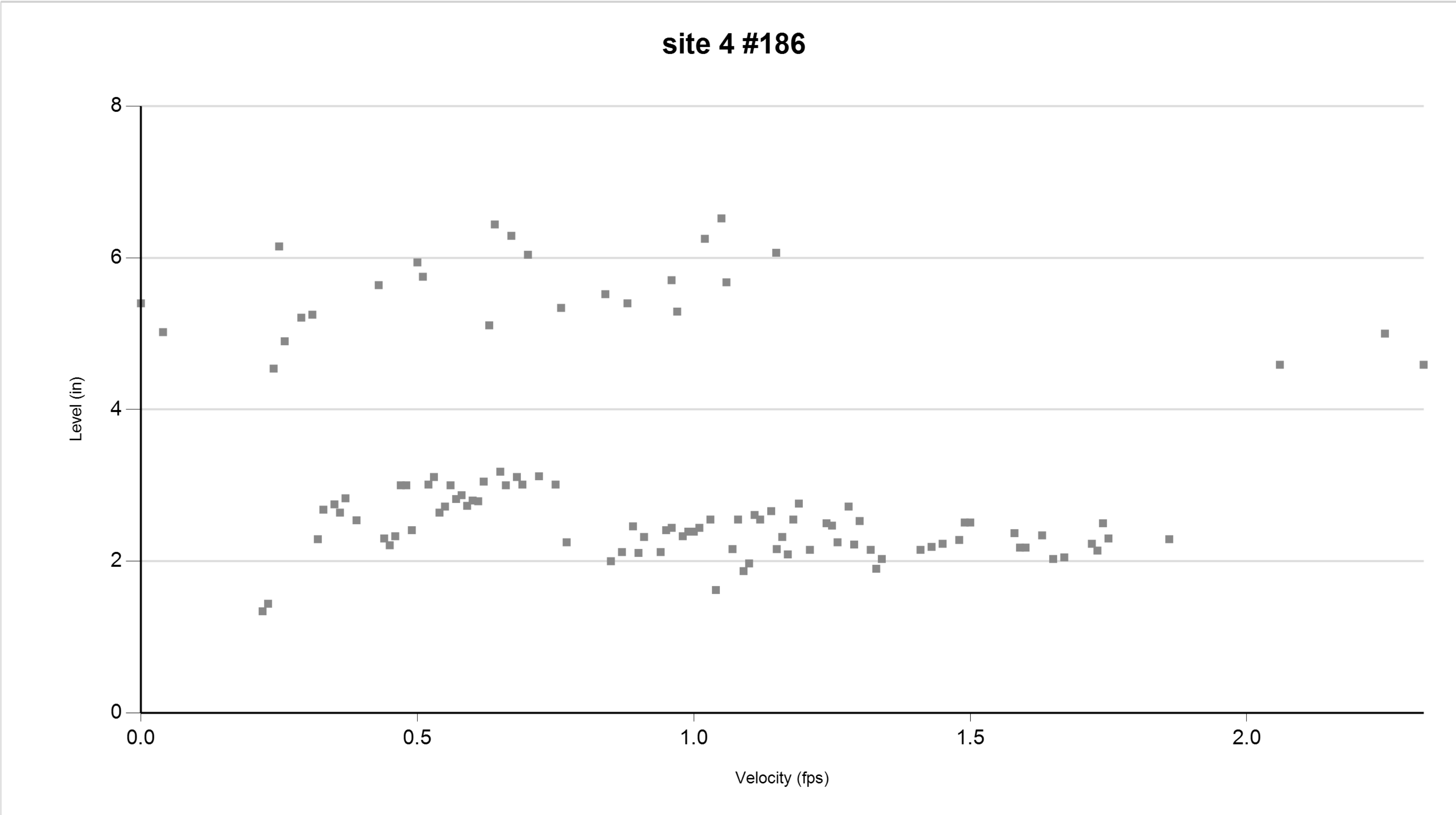



| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.521 | 2.601 | 0.041 | **RainFall** | Inches |
| Maximum | 2.320 | 6.410 | 0.396 | | |
| Minimum | 0.000 | 1.030 | 0.000 | | |

7/21/2014 4:04:52 PM




| | Velocity (fps) | Level (in) | Flow (mgd) | | | |
|---|---|---|---|---|---|---|
| Average | 0.485 | 5.583 | 0.101 | **RainFall** | Inches | |
| Maximum | 1.149 | 6.520 | 0.257 | | | |
| Minimum | 0.000 | 4.480 | 0.000 | | | 7/21/2014 4:04:52 PM |




6/30/2014 thru 7/14/2014

7/21/2014 4:04:52 PM

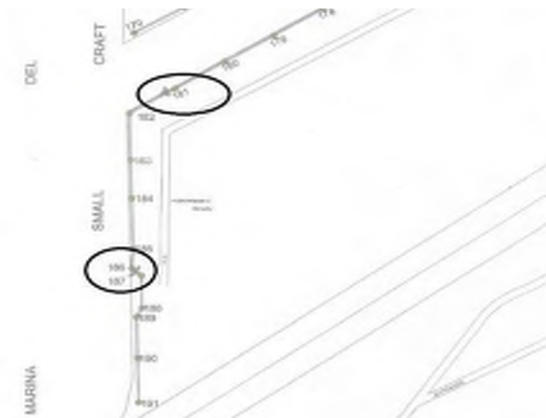
Site Report 07-21-2014

**Confidential Proprietary Information**

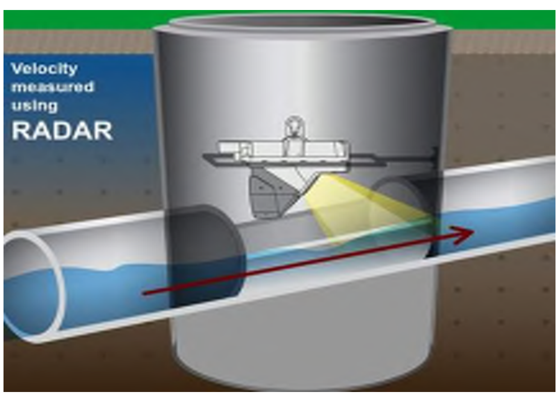
| Breen Engineering | ship yard |
|---|---|
| site 5 #181 | Manhole No.181 |

| Access: | System Type: | Install Date: 6/30/2014 |
|---|---|---|
| manhole | Sanitary [X] Storm [ ] | |

Map




Technology




Traffic Plan

| Flow Meter | | | |
|---|---|---|---|
| Meter Depth ":4'10" | | | |
| Meter SN ":***** | | | |
| slow, | | | |
| Avg Velocity | Avg Measured Level | | Multiplier |
| .51 | 4.75 | | 1 |
| **Gas** | | | |
| O2 | H2S | CO | LEL |
| 20.9 | 0 | 0 | 0 |
| **Notes** | | | |
| grease in inflow, needs to be cleaned, upstream and down stream pics show rest room dumps all the way to the center of manhole | | | |
| **Traffic Safety** | | | |
| cones | | | |
| **Land Use** | | | |
| Residential | Commercial | Industrial | Trunk |
| | | | |

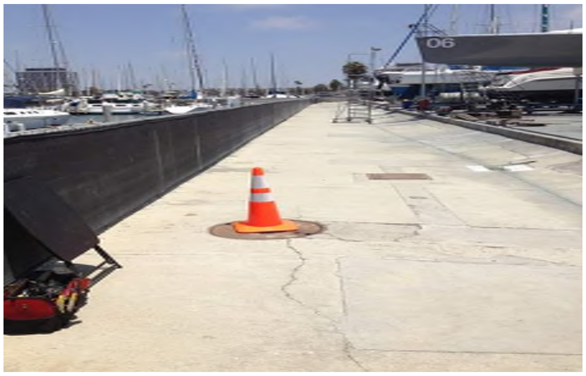
| | |
|---|---|
| Manhole Depth " | 7' |
| Pipe Size " | 10" |
| Inner Pipe Size " (In/Out) | 10"/10" |
| Pipe Shape | Round |
| Pipe Condition | fair |
| Manhole Material | concrete |
| Silt (inches) | 0 |
| Velocity Profile Data | .48 |
| Velocity Profile Taken | |
| Sensor Offset | 17.41 |
| Sensor Dist. to Crown | 7.41 |
| Flow Direction | Downstream |
| Flow Heading | East |

Meter Site Document

Breen Engineering

site 5 #181 | ship yard

Site

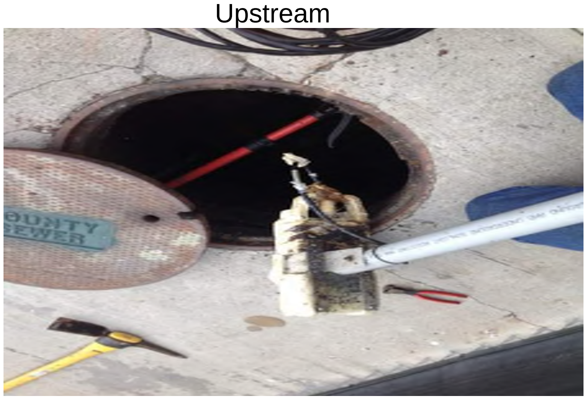


Manhole Before Install

Installation Process

Installed

Upstream



Downstream

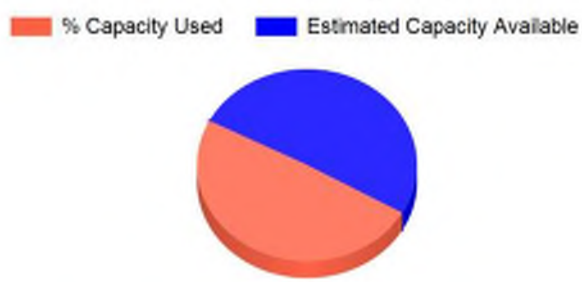
# Temporary Flow Study

## Breen Engineering

site 5 #181

| | | | |
|---|---|---|---|
| Meter Start Date | | From | 6/30/2014 12:00:00 AM |
| Meter Stop Date | | To | 7/14/2014 12:00:00 AM |
| Velocity (fps) | | Level (in) | Flow (mgd) |
| Average | 0.593 | 5.142 | 0.107 |
| Maximum | 1.839 | 7.496 | 0.465 |
| Minimum | 0.000 | 3.233 | 0.000 |
| Pipe Size | | 10.000 | |
| Estimated Capacity (mgd) | | 0.944 | |
| Capacity Used | | 49.30 % | |
| Sensor Type | | Hach - Flodar | |

**Estimated Capacity Usage**




**Utility Systems, Science and Software**

**6190 Fairmount Ave. Suite E**
**San Diego, CA 92021**

**601 N. Parkcenter Drive Suite 209**
**Santa Ana, CA 92705**

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 374

# History for site 5 #181: 06/30/2014 thru 07/14/2014

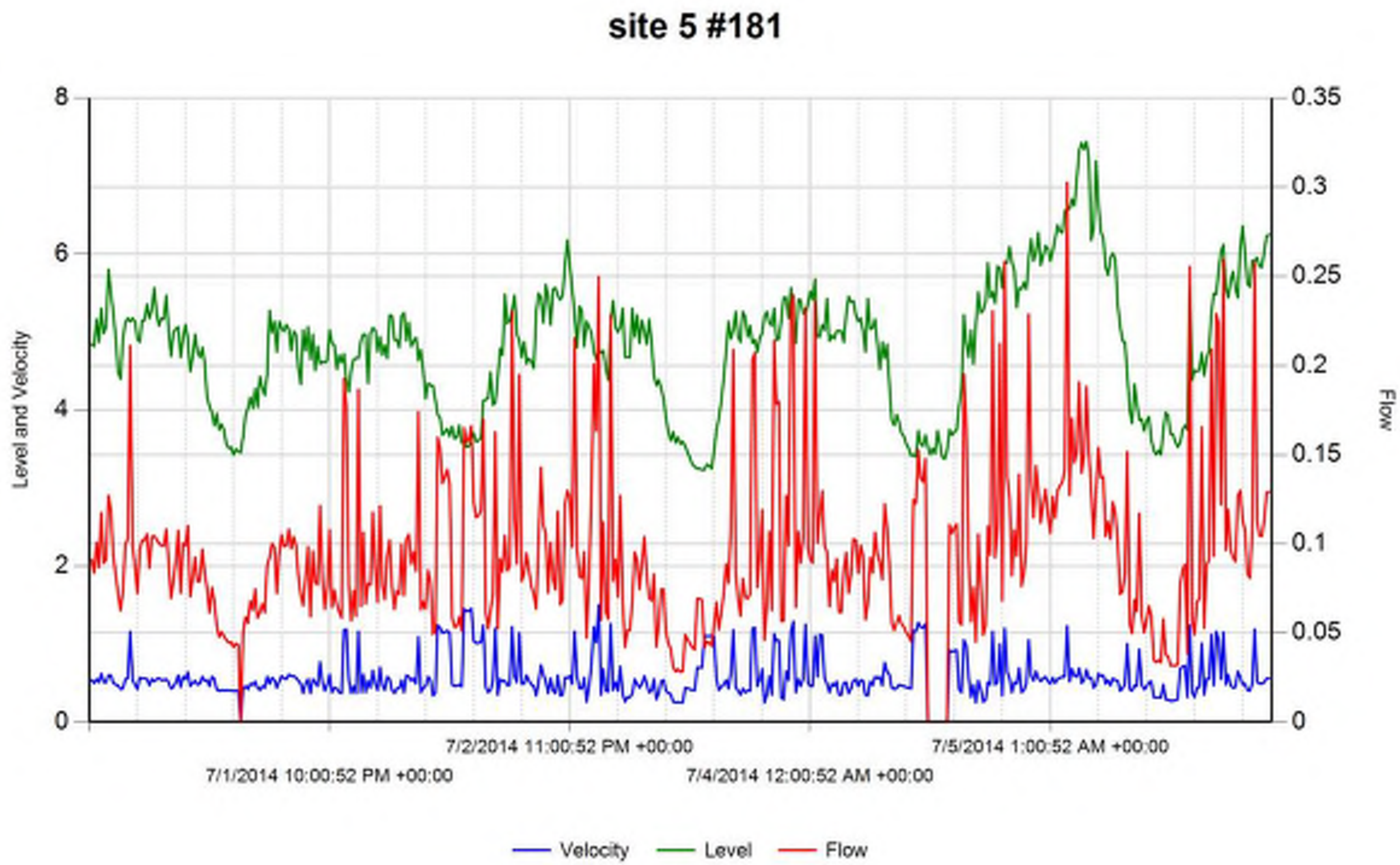
| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| 6/30/2014 | 67.30 | 146.56 | 43.44 | 0.10 | 0.21 | 0.06 | 0.54 | 1.16 | 0.42 | 5.08 | 5.80 | 4.40 | 96,908 | |
| 7/1/2014 | 55.61 | 133.79 | 0.00 | 0.08 | 0.19 | 0.00 | 0.50 | 1.19 | 0.00 | 4.58 | 5.27 | 3.43 | 80,078 | |
| 7/2/2014 | 71.02 | 173.37 | 29.09 | 0.10 | 0.25 | 0.04 | 0.66 | 1.50 | 0.26 | 4.69 | 6.18 | 3.52 | 102,262 | |
| 7/3/2014 | 60.81 | 166.29 | 19.45 | 0.09 | 0.24 | 0.03 | 0.57 | 1.29 | 0.25 | 4.67 | 5.68 | 3.23 | 87,569 | |
| 7/4/2014 | 73.70 | 210.17 | 0.00 | 0.11 | 0.30 | 0.00 | 0.57 | 1.27 | 0.00 | 5.19 | 7.44 | 3.37 | 106,131 | |
| 7/5/2014 | 70.47 | 180.79 | 22.00 | 0.10 | 0.26 | 0.03 | 0.55 | 1.24 | 0.27 | 5.05 | 6.36 | 3.43 | 101,476 | |
| 7/6/2014 | 72.57 | 183.49 | 28.91 | 0.10 | 0.26 | 0.04 | 0.55 | 1.25 | 0.28 | 5.28 | 6.44 | 3.82 | 104,499 | |
| **Week:** | **67.35** | **210.17** | **0.00** | **0.10** | **0.30** | **0.00** | **0.56** | **1.50** | **0.00** | **4.93** | **7.44** | **3.23** | **678,922** | |
| 7/7/2014 | 60.84 | 161.56 | 0.00 | 0.09 | 0.23 | 0.00 | 0.49 | 1.21 | 0.00 | 4.87 | 5.93 | 3.48 | 87,615 | |
| 7/8/2014 | 79.09 | 208.52 | 0.00 | 0.11 | 0.30 | 0.00 | 0.65 | 1.50 | 0.00 | 4.92 | 6.18 | 3.45 | 113,893 | |
| 7/9/2014 | 77.54 | 170.98 | 0.00 | 0.11 | 0.25 | 0.00 | 0.66 | 1.30 | 0.00 | 5.08 | 6.41 | 3.75 | 111,654 | |
| 7/10/2014 | 81.89 | 323.13 | 22.77 | 0.12 | 0.47 | 0.03 | 0.64 | 1.29 | 0.26 | 5.22 | 6.45 | 3.69 | 117,920 | |
| 7/11/2014 | 84.98 | 266.38 | 22.35 | 0.12 | 0.38 | 0.03 | 0.66 | 1.84 | 0.24 | 5.33 | 6.57 | 3.83 | 122,367 | |
| 7/12/2014 | 96.71 | 257.32 | 38.73 | 0.14 | 0.37 | 0.06 | 0.64 | 1.32 | 0.28 | 5.92 | 7.44 | 3.87 | 139,259 | |
| 7/13/2014 | 88.22 | 212.26 | 41.44 | 0.13 | 0.31 | 0.06 | 0.58 | 1.20 | 0.26 | 6.09 | 7.50 | 4.39 | 127,042 | |
| **Week:** | **81.32** | **323.13** | **0.00** | **0.12** | **0.47** | **0.00** | **0.62** | **1.84** | **0.00** | **5.35** | **7.50** | **3.45** | **819,750** | |

Utility Systems Science and Software

Report Date: 07/21/2014
Customer: Breen Engineering
Group: Marina Del Rey
SiteID: 374

# History for site 5 #181: 06/30/2014 thru 07/14/2014

| | Flow (GPM) | | | Flow (MGD) | | | Velocity (FPS) | | | Level (inches) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max | Min | Total Gal | Rain |
| 7/14/2014 | 61.26 | 126.78 | 0.00 | 0.09 | 0.18 | 0.00 | 0.49 | 0.92 | 0.00 | 5.08 | 6.72 | 4.34 | 88,217 | |
| **Week:** | **61.26** | **126.78** | **0.00** | **0.09** | **0.18** | **0.00** | **0.49** | **0.92** | **0.00** | **5.08** | **6.72** | **4.34** | **88,217** | |




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.568 | 4.814 | 0.094 | **RainFall** | Inches |
| Maximum | 1.500 | 7.441 | 0.303 | | |
| Minimum | 0.000 | 3.233 | 0.000 | | |

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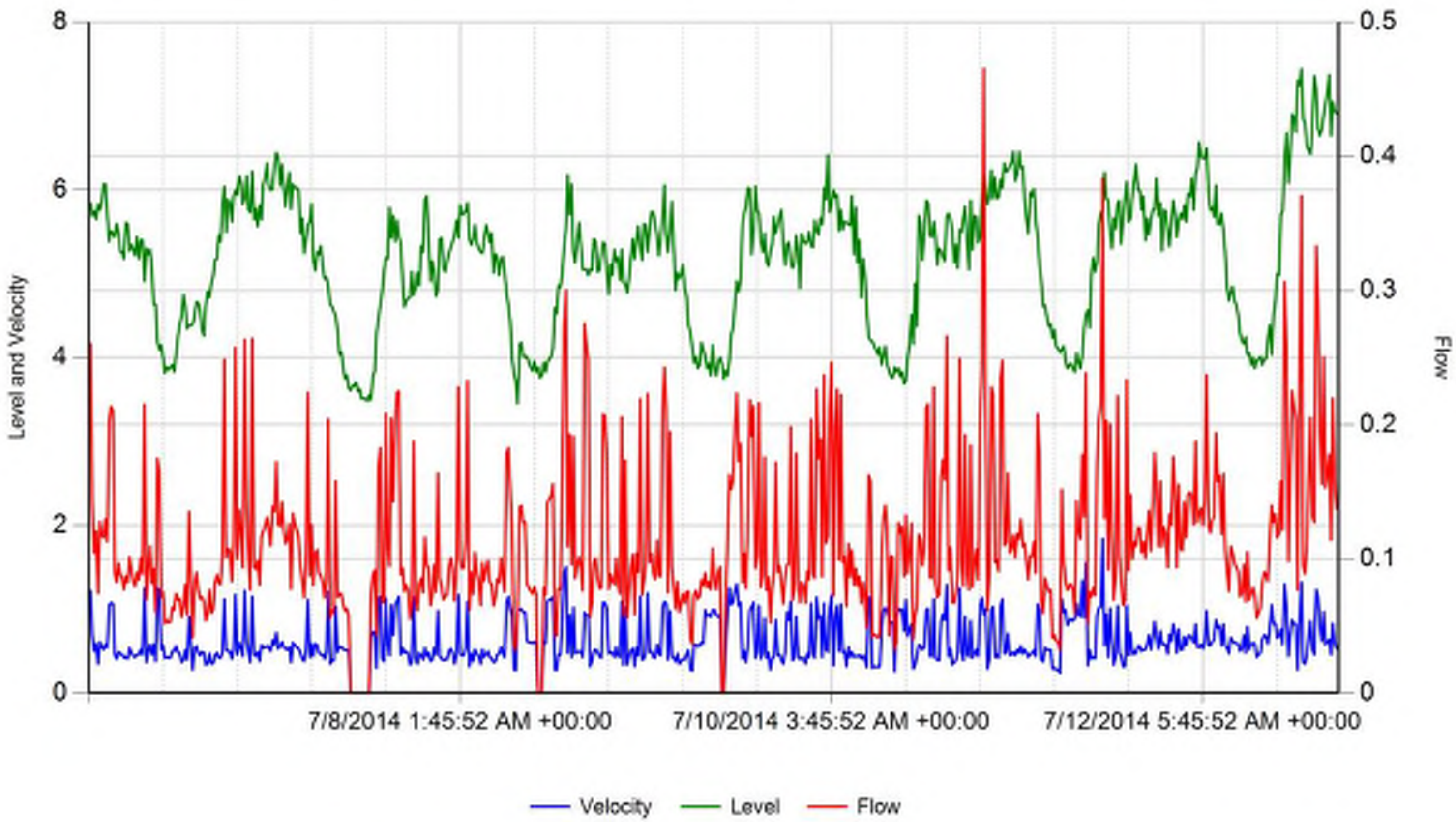
## site 5 #181




| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.614 | 5.181 | 0.113 | **RainFall** | Inches |
| Maximum | 1.839 | 7.441 | 0.465 | | |
| Minimum | 0.000 | 3.455 | 0.000 | | |

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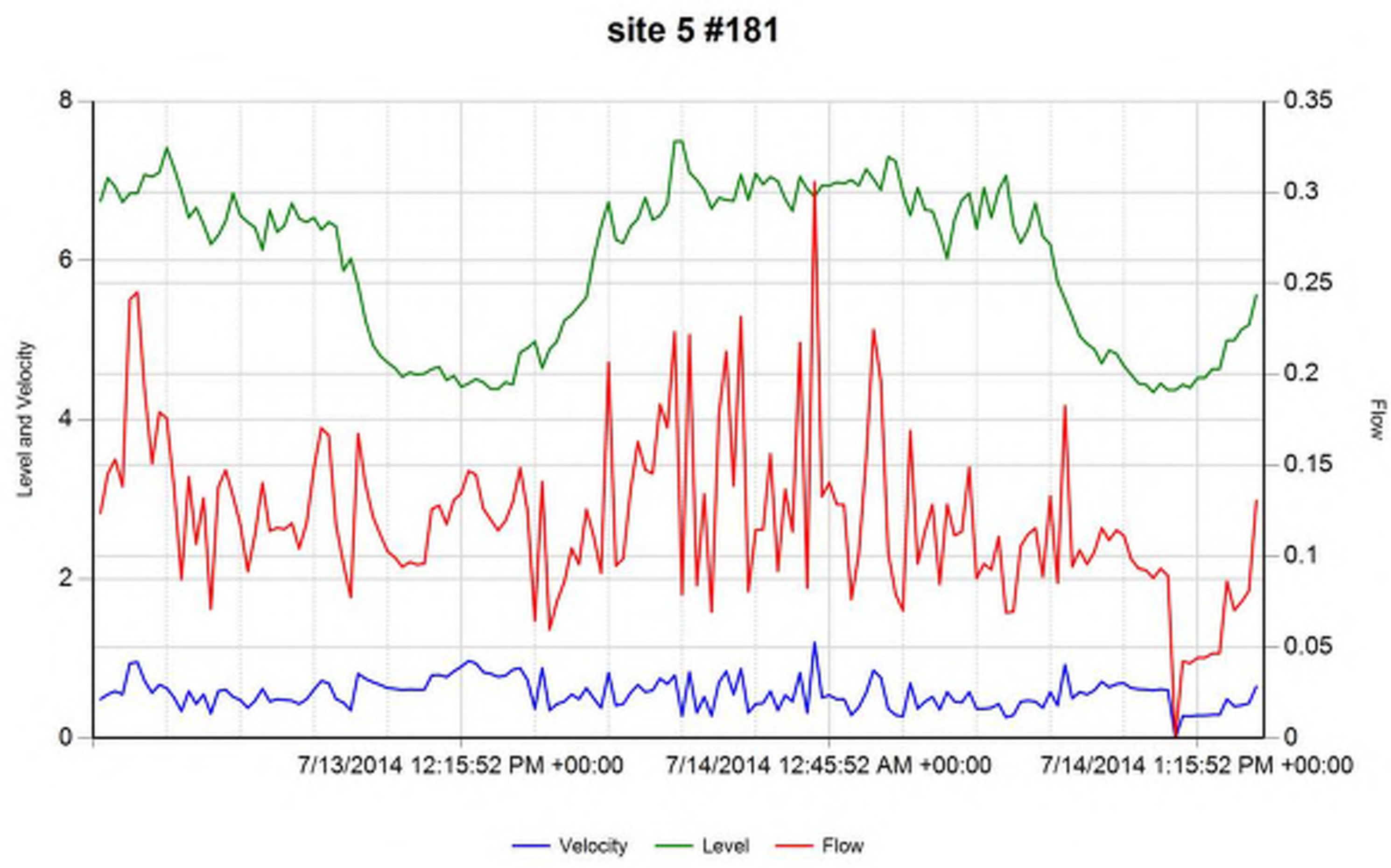


| | Velocity (fps) | Level (in) | Flow (mgd) | | |
|---|---|---|---|---|---|
| Average | 0.558 | 5.982 | 0.121 | **RainFall** | Inches |
| Maximum | 1.199 | 7.496 | 0.306 | | |
| Minimum | 0.000 | 4.344 | 0.000 | | |

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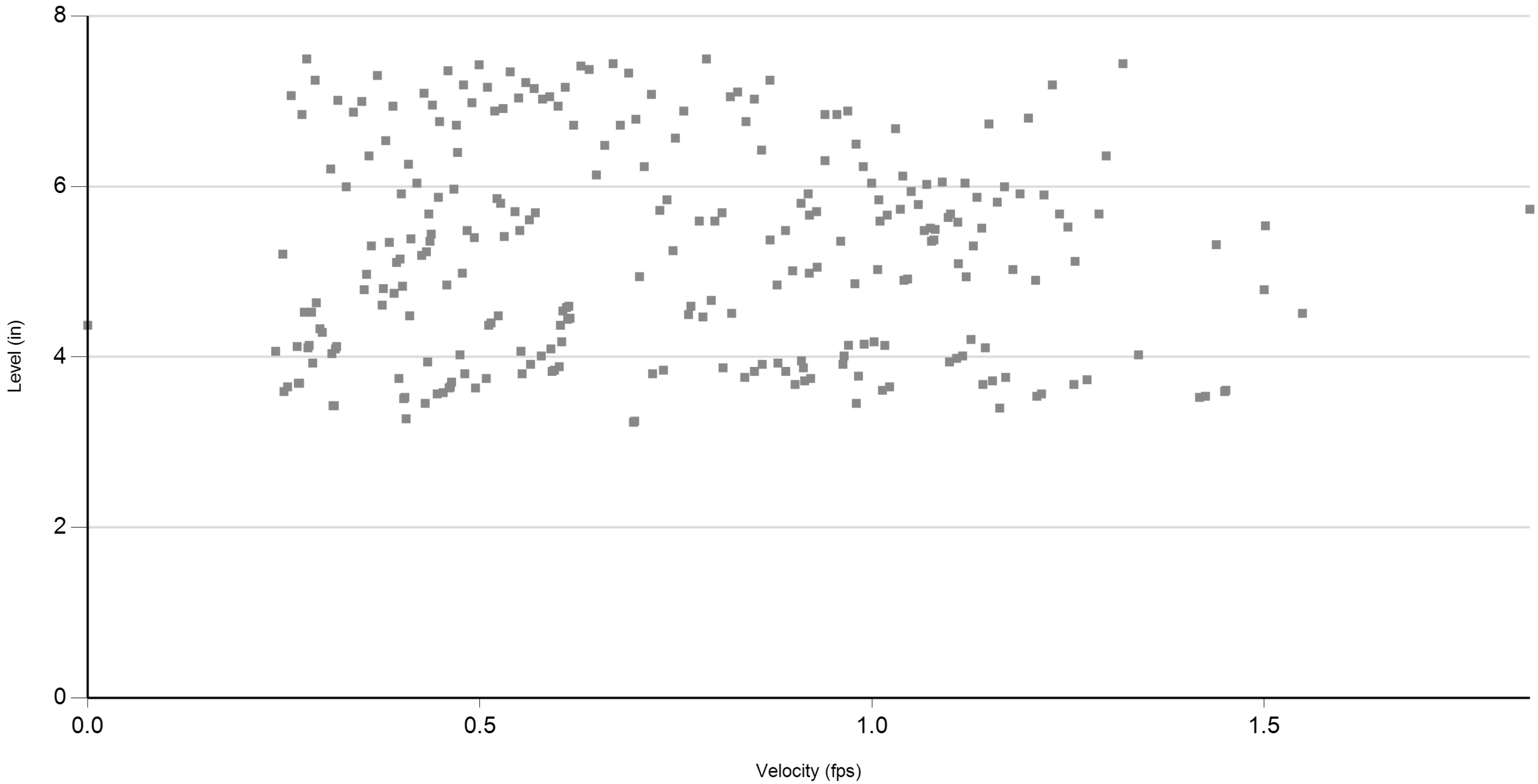
# site 5 #181




6/30/2014 thru 7/14/2014

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# Appendix II – Parcel 44 Peak Daily Flow Calculation

7

Estimated Average Daily Sewage Flows for Various Occupancies

| Occupancy | Abbreviation | *Average daily flow |
|---|---|---|
| Apartment Buildings: | | |
| Bachelor or Single dwelling units | Apt | 100 gal/D.U. → 150 |
| 1 bedroom dwelling units | Apt | 150 gal/D.U. → 200 |
| 2 bedroom dwelling units | Apt | 200 gal/D.U. → 250 |
| 3 bedroom or more dwelling units | Apt | 250 gal/D.U. → use 300 GPD per SMD |
| Auditoriums, churches, etc. | Aud | 5 gal/seat |
| Automobile parking | P | 25 gal/1000 sq ft gross floor area |
| Bars, cocktails lounges, etc. | Bar | 20 gal/seat |
| Commercial Shops & Stores | CS | 100 gal/1000 sq ft gross floor area |
| Hospitals (surgical) | HS | 500 gal/bed |
| Hospitals (convalescent) | HC | 85 gal/bed |
| Hotels | H | 150 gal/room |
| Medical Buildings | MB | 300 gal/1000 sq ft gross floor area |
| Motels | M | 150 gal/unit |
| Office Buildings | Off | 200 gal/1000 sq ft gross floor area |
| Restaurants, cafeterias, etc. | R | 50 gal/seat |
| Schools: | | |
| Elementary or Jr. High | S | 10 gal/student |
| High Schools | HS | 15 gal/student |
| Universities or Colleges | U | 20 gal/student |
| College Dormitories | CD | 85 gal/student |

*Multiply the average daily flow by 2.5 to obtain the peak flow

**Zoning Coefficients**

| Zone | Coefficient (cfs/Acre) |
|---|---|
| Agriculture | 0.001 |
| Residential⁺: | |
| R-1 | 0.004 |
| R-2 | 0.008 |
| R-3 | 0.012 |
| R-4 | 0.016* |
| Commercial: | |
| C-1 through C-4 | 0.015* |
| Heavy Industrial: | |
| M1 through M-4 | 0.021* |

*Individual building, commercial or industrial plant capacities shall be the determining factor when they exceed the coefficients shown

+ Use 0.001 (cfs/unit) for condominiums only

| Existing | | | | | |
|---|---|---|---|---|---|
| Occupancy Unit | Unit Quantity | Average Daily Flow Factor | Sewage ADF* | Sewage PDF (2.5xADF)** | Sewage PDF |
| | | (gal / 1000 sf) | (gpd) | (gpd) | (cfs) |
| Offices | 6 | 200 | 2944.8 | 7362 | 0.011391488 |
| | | | | | |
| Boat Slips | # of Slips | Average Daily Flow (gal/slip) | Sewage ADF* | Sewage PDF (2.5xADF)** | Sewage PDF |
| | | | (gpd) | (gpd) | |
| Boat Slips | 198 | 150 | 29700 | 74250 | 0.114889706 |
| | | | | **EXISTING TOTAL** | **0.126281194** |
| **Proposed** | | | | | |
| Occupancy Unit | Area (sf) | Average Daily Flow Factor | Sewage ADF* | Sewage PDF (2.5xADF)** | Sewage PDF |
| | | (gal / 1000 sf) | (gpd) | (gpd) | (cfs) |
| Trader Joe's | 13625 | 100 | 1362.5 | 3406.25 | 0.005270614 |
| Market | 500 | 100 | 50 | 125 | 0.000193417 |
| Offices | 9170 | 200 | 1834 | 4585 | 0.007094536 |
| Retail | 13295 | 100 | 1329.5 | 3323.75 | 0.005142958 |
| Yacht Club | 1150 | 200 | 230 | 575 | 0.000889718 |
| Boat Brokers Offices | 5133 | 200 | 1026.6 | 2566.5 | 0.003971238 |
| West Marine | 25000 | 200 | 5000 | 12500 | 0.019341701 |
| Boaters Lounge | 840 | 200 | 168 | 420 | 0.000649881 |
| Marine Admin. Offices | 2285 | 200 | 457 | 1142.5 | 0.001767832 |
| Boat Repair | 700 | 200 | 140 | 350 | 0.000541568 |
| Boaters Bathrooms | 1429 | 200 | 285.8 | 714.5 | 0.001105572 |
| Boaters Laundry | 271 | 200 | 54.2 | 135.5 | 0.000209664 |
| | | | | **SUBTOTAL** | 0.046178699 |
| | | | | | |
| Restaurant | # of Seats | Average Daily Flow Factor | Sewage ADF* | Sewage PDF (2.5xADF)** | Sewage PDF |
| | | ( gal / seat) | (gpd) | (gpd) | (cfs) |
| Restaurant | 382 | 50 | 19100 | 47750 | 0.073885299 |
| | | | | | |
| Boat Slips | # of Slips | Average Daily Flow (gal/slip) | Sewage ADF* | Sewage PDF (2.5xADF)** | |
| | | | (gpd) | (gpd) | |
| Boat Slips | 148 | 150 | 22200 | 55500 | 0.085877154 |
| | | | | **PROPOSED TOTAL** | **0.205941152** |

* Average Daily Flow

** Peak Daily Flow

# Appendix III – Fisherman Village Peak Daily Flow Calculation

## LOS ANGELES COUNTY DEPARTMENT OF

**Parcel 44**

| Item | Description | cfs | |
|---|---|---|---|
| | Calculate flow from existing ( Yacht club+ 14,263 Offi | 0.1263 | Calculate this based on existing |
| | Calculate flow from proposed (includes boat slips) | 0.2059 | Use the one you have already calculated |
| | Extra flow from propsed at Parcel 44 | 0.0796 | This will calculate by itself |

**Fisherman's Village**

| | | | |
|---|---|---|---|
| | Proposed (.2815cfs) | 0.2815 | Provided |
| | Flow from MH 181 | 0.8640 | Use flow rate from MH measurment |
| | Flow from MH 186 | 0.7360 | Use flow rate from MH measurment |
| | Existing flow from Fisherman's Village (MH181-MH18 | 0.1280 | This will calculate by itself |
| | Extra flow from propsed at Fisherman's Village | 0.1535 | This will calculate by itself |

**Extra flow to be added to the total flow rate measured**

| | | | |
|---|---|---|---|
| | Extra flow from propsed at Parcel 44 | 0.0796 | |
| | Extra flow from propsed at Fisherman's Village | 0.1535 | |
| | Flow rate measured upstream of PS | 0.4870 | Use flow measured at the MH U/S PS |
| | Flow rate measured upstream of PS | 0.4330 | Use flow measured at the MH U/S PS |
| | Flow rate measured upstream of PS | 0.0000 | Use flow measured at the MH U/S PS |
| | **Total future flow to the PS** | 1.1531 | This will calculate by itself |

Note: Please plug in the number at the following Cells
C3,C4,C10,C11,C18,C19,C20 (All with .9000)

# Appendix IV – Kutters Formula Spreadsheets

MH#61 NO OVERFLOW CONDITION

***Cells that are highlighted can be changed***

**GIVEN:**

| | | | |
|---|---|---|---|
| $Q_{given}$= | **1.159** | cfs | ***<== Discharge*** |
| n= | **0.013** | | ***<== Roughness coefficient*** |
| S= | **0.0012** | | ***<== Slope V:H*** |
| r= | **0.625** | ft | ***<== Radius*** |

**TRIAL DEPTH:**

| | | | |
|---|---|---|---|
| h= | **7.800** | in | ***<== Vary this depth to get $Q_{assume}$ = $Q_{given}$*** |
| | 0.650 | ft | |

**CACULATIONS:**

| | | | | | |
|---|---|---|---|---|---|
| beta= | 92.29 | degree | | | |
| R= | 0.320 | ft | | | |
| C= | 91.168 | | | | |
| V= | 1.787 | ft/sec | | | |
| A= | 0.645 | sq. ft. | | | |
| $Q_{assume}$= | 1.152 | cfs | | | |
| **$Q_{halffull}$ =** | **1.08** | **cfs** | **$Q_{3/4full}$ =** | **1.99** | **cfs** |

**RESULT:**

| | | | |
|---|---|---|---|
| (Qgiven-Qassume) / Qgiven %= | 1% | **<========** | **OK** |
| **Flow Depth (in) =** | **7.800** | | |
| **Capacity d/r =** | **104.00%** | | |
| **$Q_{capacity}$ =** | **1.993** | **cfs** | |
| **Capacity $Q_{given}$/$Q_{capacity}$ =** | **58.14%** | | |

| | | | | | |
|---|---|---|---|---|---|
| **($Q_{halffull}$ =** | 1.08 | **cfs** | **($Q_{3/4full}$ =** | 1.99 | **cfs** |
| beta $_{halffull}$= | 90.000 | degree | beta $_{3/4full}$= | 120.00 | degree |
| $R_{halffull}$ = | 0.313 | ft | $R_{3/4full}$= | 0.377 | ft |
| $C_{halffull}$ = | 90.643 | ft | $C_{3/4full}$= | 94.911 | ft |
| $A_{halffull}$ = | 0.614 | sq. ft. | $A_{3/4full}$= | 0.987 | sq. ft. |
| $V_{halffull}$ = | 1.757 | ft/sec) | $V_{3/4full}$= | 2.019 | ft/sec) |

MH #61 OVERFLOW CONDITION,
EXISTING CONDITIONS

***Cells that are highlighted can be changed**

**GIVEN:**

| | | | |
|---|---|---|---|
| $Q_{given}$= | **1.924** | cfs | ***<== Discharge*** |
| n= | **0.013** | | ***<== Roughness coefficient*** |
| S= | **0.0012** | | ***<== Slope V:H*** |
| r= | **0.625** | ft | ***<== Radius*** |

**TRIAL DEPTH:**

| | | | |
|---|---|---|---|
| h= | **11.000** | in | ***<== Vary this depth to get $Q_{assume}$ = $Q_{given}$*** |
| | 0.917 | ft | |

**CACULATIONS:**

| | | |
|---|---|---|
| beta= | 117.82 | degree |
| R= | 0.375 | ft |
| C= | 94.796 | |
| V= | 2.012 | ft/sec |
| A= | 0.964 | sq. ft. |
| $Q_{assume}$= | 1.940 | cfs |
| **$Q_{halffull}$ =** | **1.08** | **cfs** |
| **$Q_{3/4full}$ =** | **1.99** | **cfs** |

**RESULT:**

| | | | |
|---|---|---|---|
| (Qgiven-Qassume) / Qgiven %= | -1% | <======== | **OK** |

| | |
|---|---|
| **Flow Depth (in) =** | **11.000** |
| **Capacity d/r =** | **146.67%** |
| **$Q_{capacity}$ =** | **1.993 cfs** |
| **Capacity $Q_{given}/Q_{capacity}$ =** | **96.52%** |

| | | | | | |
|---|---|---|---|---|---|
| **($Q_{halffull}$ =** | 1.08 **cfs** | | **($Q_{3/4full}$ =** | 1.99 **cfs** | |
| beta $_{halffull}$= | 90.000 | degree | beta $_{3/4full}$= | 120.00 | degree |
| $R_{halffull}$ = | 0.313 | ft | $R_{3/4full=}$ | 0.377 | ft |
| C $_{halffull}$ = | 90.643 | ft | C $_{3/4full=}$ | 94.911 | ft |
| A $_{halffull}$ = | 0.614 | sq. ft. | A $_{3/4full=}$ | 0.987 | sq. ft. |
| V $_{halffull}$ = | 1.757 | ft/sec) | V $_{3/4full=}$ | 2.019 | ft/sec) |

MH #61 OVEFLOW CONDITION, WITH
P44 REDEVELOPMENT

***Cells that are highlighted can be changed***

**GIVEN:**

| | | | |
|---|---|---|---|
| $Q_{given}$= | **2.004** | cfs | *<== Discharge* |
| n= | **0.013** | | *<== Roughness coefficient* |
| S= | **0.0012** | | *<== Slope V:H* |
| r= | **0.625** | ft | *<== Radius* |

**TRIAL DEPTH:**

| | | | |
|---|---|---|---|
| h= | **11.250** | in | *<== Vary this depth to get $Q_{assume}$ = $Q_{given}$* |
| | 0.938 | ft | |

**CACULATIONS:**

| | | |
|---|---|---|
| beta= | 120.00 | degree |
| R= | 0.377 | ft |
| C= | 94.911 | |
| V= | 2.019 | ft/sec |
| A= | 0.987 | sq. ft. |
| $Q_{assume}$= | 1.993 | cfs |
| **$Q_{halffull}$ =** | **1.08** | **cfs** |
| **$Q_{3/4full}$ =** | **1.99** | **cfs** |

**RESULT:**

| | | | |
|---|---|---|---|
| ($Q_{given}$-$Q_{assume}$) / $Q_{given}$ %= | 1% | <======== | **OK** |
| **Flow Depth (in) =** | **11.250** | | |
| **Capacity d/r =** | **150.00%** | | |
| **$Q_{capacity}$ =** | **1.993** | **cfs** | |
| **Capacity $Q_{given}$/$Q_{capacity}$ =** | **100.54%** | | |

| | | | | | |
|---|---|---|---|---|---|
| **($Q_{halffull}$ =** | 1.08 | **cfs** | **($Q_{3/4full}$ =** | 1.99 | **cfs** |
| beta $_{halffull}$= | 90.000 | degree | beta $_{3/4full}$= | 120.00 | degree |
| $R_{halffull}$ = | 0.313 | ft | $R_{3/4full}$= | 0.377 | ft |
| $C_{halffull}$ = | 90.643 | ft | $C_{3/4full}$= | 94.911 | ft |
| $A_{halffull}$ = | 0.614 | sq. ft. | $A_{3/4full}$= | 0.987 | sq. ft. |
| $V_{halffull}$ = | 1.757 | ft/sec) | $V_{3/4full}$= | 2.019 | ft/sec) |

# MH #61 OVEFLOW CONDITION, WITH P44 AND FV REDEVELOPMENT

***Cells that are highlighted can be changed***

**GIVEN:**

| | | | |
|---|---|---|---|
| $Q_{given}$= | **2.179** | cfs | *<== Discharge* |
| n= | **0.013** | | *<== Roughness coefficient* |
| S= | **0.0012** | | *<== Slope V:H* |
| r= | **0.625** | ft | *<== Radius* |

**TRIAL DEPTH:**

| | | | |
|---|---|---|---|
| h= | **12.250** | in | *<== Vary this depth to get $Q_{assume} = Q_{given}$* |
| | 1.021 | ft | |

**CACULATIONS:**

| | | |
|---|---|---|
| beta= | 129.30 | degree |
| R= | 0.380 | ft |
| C= | 95.108 | |
| V= | 2.032 | ft/sec |
| A= | 1.073 | sq. ft. |
| $Q_{assume}$= | 2.180 | cfs |

| | | | | | |
|---|---|---|---|---|---|
| $Q_{halffull}$ = | **1.08** | **cfs** | $Q_{3/4full}$ = | **1.99** | **cfs** |

**RESULT:**

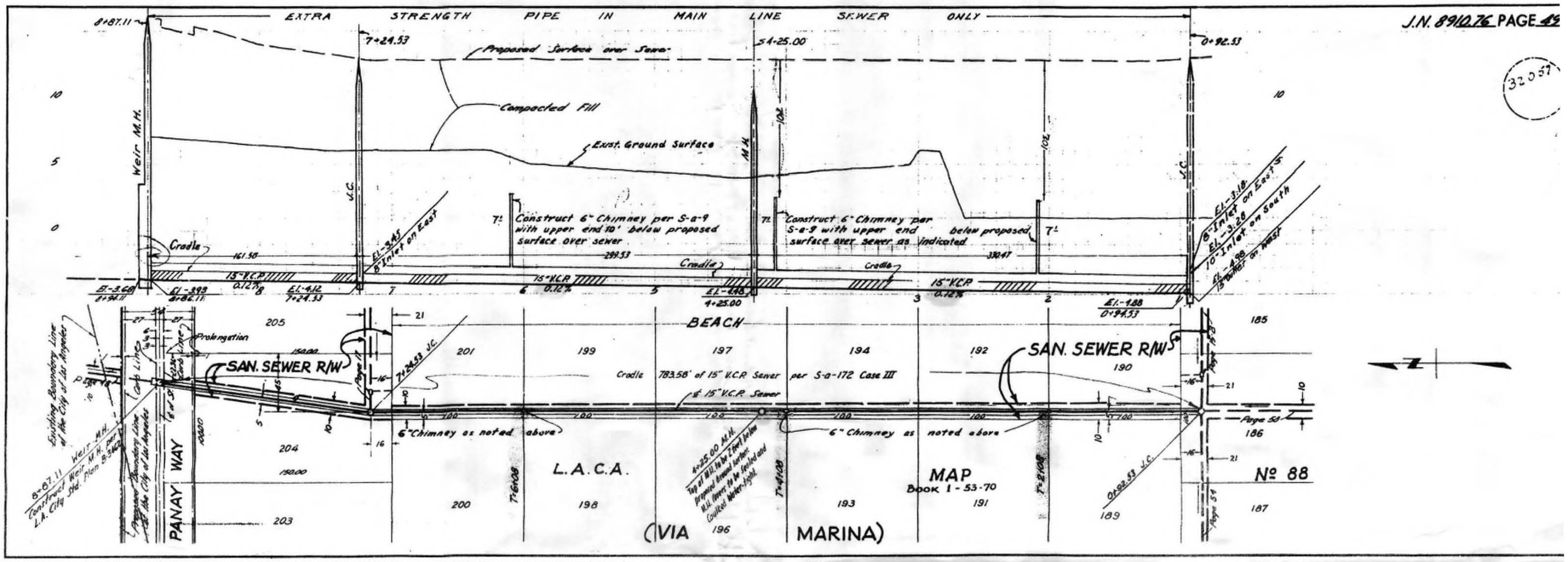
| | | |
|---|---|---|
| ($Q_{given}$-$Q_{assume}$) / $Q_{given}$ %= | 0% | <========= **OK** |
| **Flow Depth (in) =** | **12.250** | |
| **Capacity d/r =** | **163.33%** | |
| $Q_{capacity}$ = | **1.993** | **cfs** |
| **Capacity $Q_{given}/Q_{capacity}$ =** | **109.32%** | |

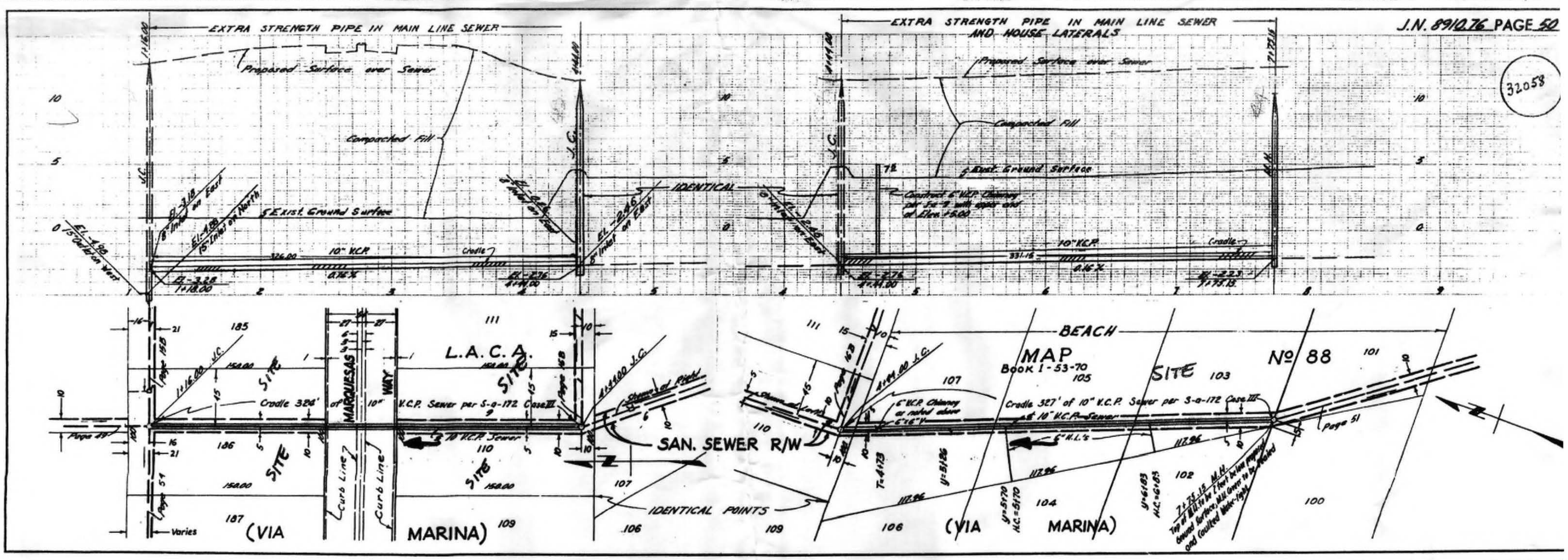
| | | | | | |
|---|---|---|---|---|---|
| ($Q_{halffull}$ = | 1.08 | **cfs** | ($Q_{3/4full}$ = | 1.99 | **cfs** |
| beta $_{halffull}$= | 90.000 | degree | beta $_{3/4full}$= | 120.00 | degree |
| $R_{halffull}$ = | 0.313 | ft | $R_{3/4full}$= | 0.377 | ft |
| $C_{halffull}$ = | 90.643 | ft | $C_{3/4full}$= | 94.911 | ft |
| $A_{halffull}$ = | 0.614 | sq. ft. | $A_{3/4full}$= | 0.987 | sq. ft. |
| $V_{halffull}$ = | 1.757 | ft/sec) | $V_{3/4full}$= | 2.019 | ft/sec) |

# Appendix V – Sewer As Builts


S-1438
MARINA DEL REY
SEE SHT. NO. S-1437
MARINA DEL REY
CITY OF LOS ANGELES
BASIN E
BASIN D
BASIN C
BASIN B
BASIN A
BASIN F
BASIN G
BASIN H
DEL REY YACHT CLUB
HOLIDAY DEL REY
VISTA DEL MAR MARINA
BEAUVILLE MARINA
THE ANCHORAGE
MARINA POINT HARBOR
TAHITI YACHT LANDING
CITY OF LOS ANGELES BOUNDARY
( LOS ANGELES COUNTY )
SMALL CRAFT HARBOR
MARINA DEL REY
FISHERMAN'S WHARF
CITY OF LOS ANGELES
SANTA MONICA BAY
VENICE BEACH PUMP STATION
THIS MAP IS INTENDED FOR USE ONLY AS OPERATIONS MAP BY LOS ANGELES COUNTY SEWER MAINTENANCE DISTRICTS. LOS ANGELES COUNTY EXPRESSLY DISCLAIMS ANY LIABILITY FOR ANY INACCURACIES WHICH MAY BE PRESENT IN THIS MAP.
N
AUTOMATED GRAPHICS
METERS
0 50 100 200 250
0 200 400 600 800
FEET
LEGEND
PLASTIC SEWERS
CONCRETE SEWERS
CLAY SEWERS LINED
CEMENT SEWERS LINED
FORCE MAINS
TRUNK SEWERS
CITY BOUNDARY
STANDARD MANHOLE
DROP MANHOLE
SHALLOW MANHOLE
TRAP MANHOLE
WEIR MANHOLE
CLEANOUT
LAMP HOLE
PUMP STATION
MAP REV 04-10-06
DATA BASE REV 09-20-05
MARINA DEL REY S.M.D.
S-1438
S-1438

MH 61


J.N. 8910.76 PAGE 49
32057
EXTRA STRENGTH PIPE IN MAIN LINE SEWER ONLY
8+87.11
7+24.53
4+25.00
0+92.53
Proposed Surface over Sewer
Compacted Fill
Exist. Ground Surface
Weir M.H.
J.C.
M.H.
Construct 6" Chimney per S-a-9 with upper end 10' below proposed surface over sewer
Construct 6" Chimney per S-a-9 with upper end below proposed surface over sewer as indicated
Cradle
15" V.C.P.
0.12%
BEACH
SAN. SEWER R/W
Cradle 783.58' of 15" V.C.R. Sewer per S-a-172 Case III
6" Chimney as noted above
L.A.C.A.
MAP
Book 1-53-70
Nº 88
PANAY WAY
(VIA MARINA)
Existing Boundary Line of the City of Los Angeles
Prolongation
Construct Weir M.H. per L.A. City Std. Plan B-5462


J.N. 8910.76 PAGE 50
32058
EXTRA STRENGTH PIPE IN MAIN LINE SEWER
EXTRA STRENGTH PIPE IN MAIN LINE SEWER AND HOUSE LATERALS
Proposed Surface over Sewer
Compacted Fill
Exist. Ground Surface
IDENTICAL
J.C.
M.H.
10" V.C.R.
0.16%
Cradle
BEACH
L.A.C.A.
MAP
Book 1-53-70
Nº 88
SITE
MARQUESAS WAY
Curb Line
Cradle 326' of 10" V.C.P. Sewer per S-a-172 Case III
Cradle 327' of 10" V.C.P. Sewer per S-a-172 Case III
SAN. SEWER R/W
IDENTICAL POINTS
(VIA MARINA)
Varies

# APPENDIX 4.10.2

## Water Availability Study

1983 West 190th Street, Suite 200
Torrance, Ca. 90504
**Tel:** 310-464-8404 **Fax:** 310-464-8408
www.breeneng.com

# WATER AVAILABILITY STUDY

## PARCEL 44

## MARINA DEL REY
## COUNTY OF LOS ANGELES

BEI PROJECT #187-07-003C

Date: October 1, 2012
(Revised October 10, 2012)

# TABLE OF CONTENTS

# 1. INTRODUCTION

Marina Del Rey Parcel 44 project is an approximately 8.40 acre site and is located in the Marina Del Rey area of Unincorporated Los Angeles County. The project is located on Admiralty Way, between Bali Way and Mindanao Way.

The site is currently developed with a combination of uses including 6 small office structures, and boat slips. The site's water demand is provided by the Los Angeles County Department of Public Works (LACDPW) Waterworks and Sewer Maintenance Division, District 29.

For entitlement purposes, a study is necessary to determine the increase in water demand caused by the project and any impact it may have on the LACDPW distribution system. This report summarizes that study.

# 2. EXISTING CONDITIONS

## 2.1 EXISTING SERVICE

According to as-built plans provided by LACDPW, the existing site facilities are served by a 14-in. a.c. (asbestos cement) water main in Admiralty Way, an 8-in. a.c. water main in Bali Way, and a 10-in. a.c. water main in Mindanao Way. See Appendix i for the Marina Del Rey water system maps.

Tests performed by the Waterworks District confirmed a residual pressure of 72 psi in the 8-in. line in Bali Way and static pressure of 92 psi at an observed flow of 2500 gpm. Data also showed the residual pressure of 80 psi on the 10-in. line in Mindanao Way and static pressure of 95 psi at an observed flow of 3350 gpm. See Appendix iii for Waterworks' flow test data.

## 2.2 EXISTING WATER CONSUMPTION AND DEMAND

The existing water consumption was determined assuming that the sewer generation rate is 90% of the water consumption rate. Sewage generation was determined using the LACDPW Estimated Average Daily Sewage Flows for Various Occupancies chart used for sewer area studies (See Appendix ii). Based on this, consumption for the existing condition is estimated at 90,680 gpd or 63 gpm.

There are 3 existing public hydrants in the street, and no existing hydrants on site.

2.3 EXISTING WATER DEMAND TABLE

| Occupancy Unit | Unit Quantity | Average Daily Flow Factor | Sewage ADF* | Sewage PDF (2.5xADF)** | Daily Water Demand | | |
|---|---|---|---|---|---|---|---|
| | | (gal / 1000 sf) | (gpd) | (gpd) | (gpd) | (gpm) | (Ac-ft/yr) |
| Offices | 6 | 200 | 2944.8 | 7362 | 8180.0 | 5.68 | 9.2 |
| | | | | **TOTAL** | **8180.0** | **5.68** | **9.2** |

| Existing | Boat Slips | Average Daily Flow (gal/slip) | Sewage ADF* | Sewage PDF (2.5xADF)** | Daily Water Demand | | |
|---|---|---|---|---|---|---|---|
| | | | (gpd) | (gpd) | (gpd) | (gpm) | (Ac-ft/yr) |
| | 198 | 150 | 29700 | 74250 | 82500.0 | 57.29 | 92.4 |
| | | | | **TOTAL** | **82500.0** | **57.29** | **92.4** |

*Average daily flow
**Peak daily flow

# 3. PROPOSED CONDITIONS

3.1 PROPOSED SERVICE

The Marina Del Rey Water System was originally designed in 1961/62 to accommodate low density, two-story structure land use. Since the land use changed, the County of Los Angeles Department of Beaches and Harbors conducted an adequacy study which determined that the existing system required an upgrade to meet increased demands. According to LA County, a future 18-in. water line is proposed in Admiralty Way.

3.2 PROPOSED WATER CONSUMPTION AND DEMAND

The proposed site will include three retail stores, a 2 story structure building that will accommodate office and retail space, a yacht club, boaters lounge and boat storage and repair area. Based on the same assumption and sewer factors used for the existing condition, the proposed development will result in a domestic water consumption of 107,132 gpd or 74.4 gpm. This results in a 118% net increase of 16,452 gpd, 11.49 gpm.

In order to provide adequate fire protection for the site, a preliminary review by the Los Angeles County Fire Department indicates that eight new fire hydrants will be required on site to accommodate a fire flow demand of 2,000 gpm at 20 psi.

## 3.2 PROPOSED WATER DEMAND TABLE

| Occupancy Unit | Area (sf) | Average Daily Flow Factor | Sewage ADF* | Sewage PDF (2.5xADF)** | Daily Water Demand | | |
|---|---|---|---|---|---|---|---|
| | | (gal / 1000 sf) | (gpd) | (gpd) | (gpd) | (gpm) | (Ac-ft/yr) |
| Unistack | 26300 | 200 | 5260 | 13150 | 14611.1 | 10.15 | 16.4 |
| Trader Joe's | 13325 | 100 | 1332.5 | 3331.25 | 3701.4 | 2.57 | 4.1 |
| Boat Brokers | 8900 | 200 | 1780 | 4450 | 4944.4 | 3.43 | 5.5 |
| Yacht Club | 1402 | 200 | 280.4 | 701 | 778.9 | 0.54 | 0.9 |
| Boat Brokers Offices | 8395 | 100 | 839.5 | 2098.75 | 2331.9 | 1.62 | 2.6 |
| West Marine | 25605 | 200 | 5121 | 12802.5 | 14225.0 | 9.88 | 15.9 |
| Community Room | 938 | 200 | 187.6 | 469 | 521.1 | 0.36 | 0.6 |
| Boaters Lounge | 878 | 200 | 175.6 | 439 | 487.8 | 0.34 | 0.5 |
| Unistack Offices | 2838 | 200 | 567.6 | 1419 | 1576.7 | 1.09 | 1.8 |
| Marine Admin. Offices | 4332 | 200 | 866.4 | 2166 | 2406.7 | 1.67 | 2.7 |
| Boat Repair | 2290 | 200 | 458 | 1145 | 1272.2 | 0.88 | 1.4 |
| Boaters Bathrooms | 1048 | 200 | 209.6 | 524 | 582.2 | 0.40 | 0.7 |
| Boaters Laundry | 197 | 200 | 39.4 | 98.5 | 109.4 | 0.08 | 0.1 |
| | | | | **TOTAL** | **47548.9** | **33.02** | **53.2** |

| Proposed | Boat Slips | Average Daily Flow (gal/slip) | Sewage ADF* | Sewage PDF (2.5xADF)** | Daily Water Demand | | |
|---|---|---|---|---|---|---|---|
| | | | (gpd) | (gpd) | (gpd) | (gpm) | (Ac-ft/yr) |
| | 143 | 150 | 21450 | 53625 | 59583.3 | 41.38 | 66.7 |
| | | | | **TOTAL** | **59583.3** | **41.38** | **66.7** |

*Average daily flow
**Peak daily flow

## II. CONCLUSION

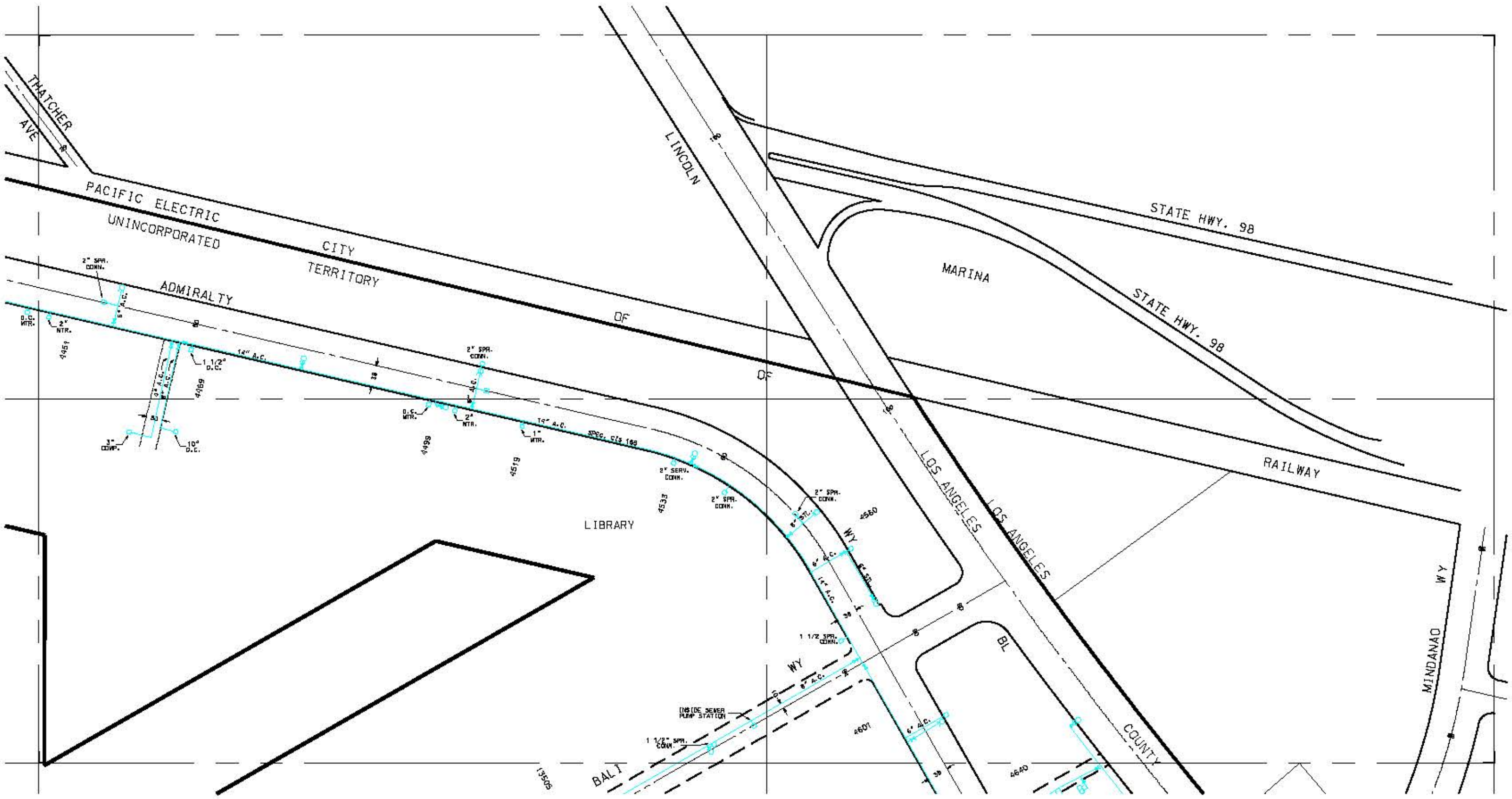
The proposed development will result in an increase in both fire protection and domestic water demands. However based on our calculations using the Hazen-Williams method and the confirmed flow and pressures of the existing County system, this system is more than adequate to provide for both onsite and offsite fire flow demands required by the Fire Department (2000 gpm @ 20 psi) for the new development, and the domestic flows as well.

At the appropriate time, an application for new metered water service will be processed with the LACDPW Waterworks District to determine the availability of pressures and flow necessary to serve the site from both a domestic and fire protection standpoint. In recognition of the phased improvements being made by the County, the onsite service will have to be sized based on the most current information provided by the Waterworks District, to ensure adequate fire protection and domestic water pressures are provided.

# Marina Del Rey Water System
# Appendix i

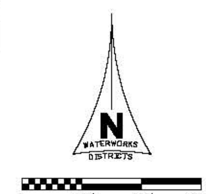
SEE SHEET NONE

SEE SHEET MDR 5




SEE SHEET NONE

SEE SHEET MDR 9




THIS MAP IS INTENDED FOR USE ONLY AS A WATER OPERATIONS MAP BY THE LOS ANGELES COUNTY WATERWORKS DISTRICTS AND IS BASED UPON INFORMATION AVAILABLE FROM PUBLIC RECORDS. THE LOS ANGELES COUNTY WATERWORKS DISTRICTS EXPRESSLY DISCLAIM ANY LIABILITY FOR ANY INACCURACIES WHICH MAY BE PRESENT IN THIS MAP.

LEGEND

WATERMAINS
ABANDONED WATERMAINS
GATE VALVES
SERVICES
SERVICES & METERS
REDUCER

FIRE HYDRANTS
4 X 2 1/2
6 X 2 1/2
6 X 4 X 2 1/2
REFERENCE NO. TO INTERSECTION DETAILS (358)
AIR & VACUUM RELEASE VALVE
4 X 2 1/2 FLUSHOUT

| DATE | DRAWN | CHECK'D | REVISIONS |
|---|---|---|---|
| APR. 01 | JF | | |
| DEC. 00 | JF | | |

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
WATERWORKS AND SEWER MAINTENANCE DIVISION

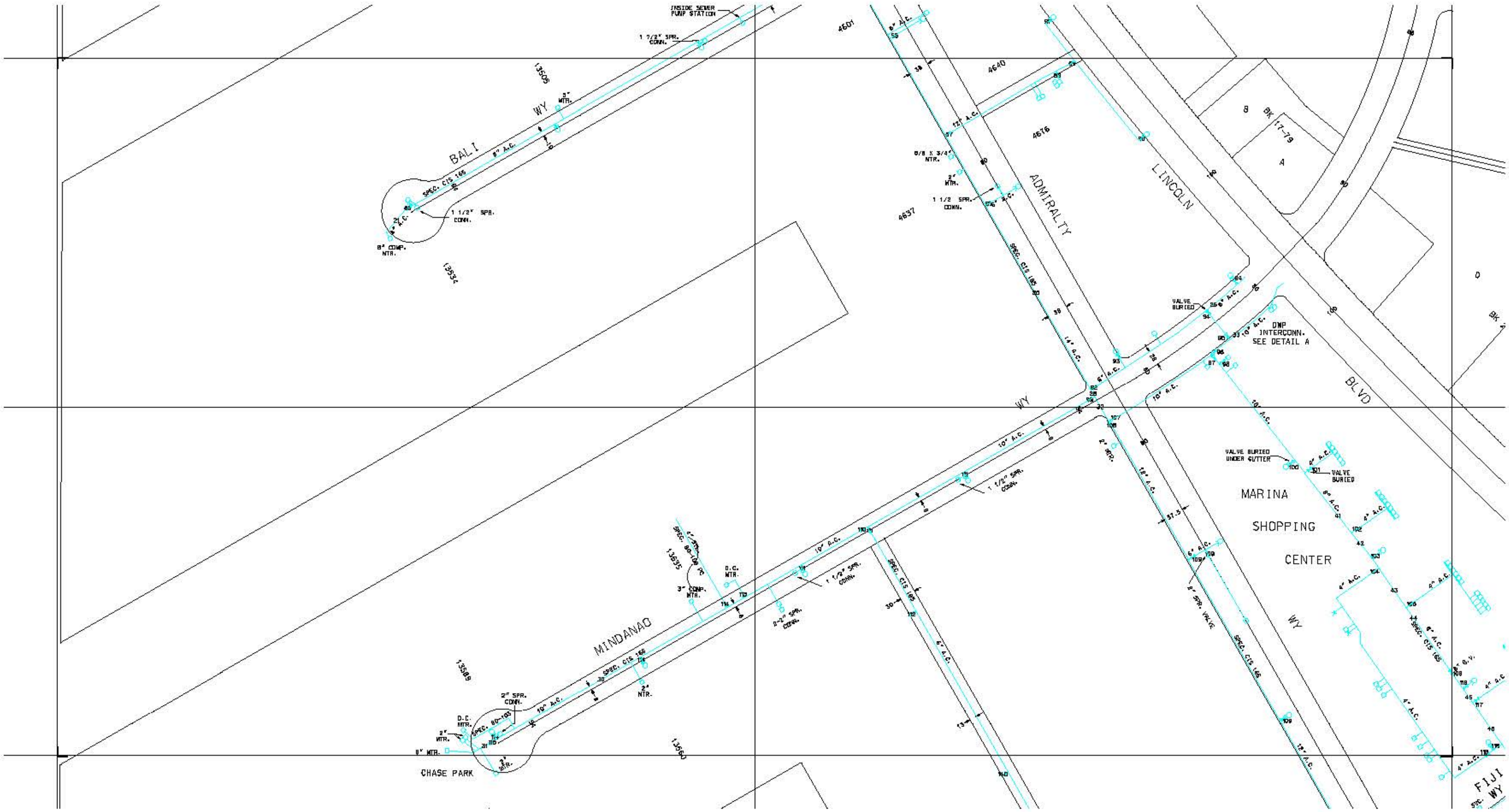
**MARINA DEL REY WATER SYSTEM**

| | |
|---|---|
| DATE: | OCTOBER 2000 |
| DRAWN BY | JF |
| CHECKED BY | PS |

MDR 6

SEE SHEET MDR 6

SEE SHEET MDR 8




SEE SHEET MDR 10

SEE SHEET MDR 13

*THIS MAP IS INTENDED FOR USE ONLY AS A WATER OPERATIONS MAP BY THE LOS ANGELES COUNTY WATERWORKS DISTRICTS AND IS BASED UPON INFORMATION AVAILABLE FROM PUBLIC RECORDS. THE LOS ANGELES COUNTY WATERWORKS DISTRICTS EXPRESSLY DISCLAIM ANY LIABILITY FOR ANY INACCURACIES WHICH MAY BE PRESENT IN THIS MAP.

LEGEND

WATERMAINS
ABANDONED WATERMAINS
GATE VALVES
SERVICES
SERVICES & METERS
REDUCER

FIRE HYDRANTS
4 X 2 1/2
6 X 2 1/2
6 X 4 X 2 1/2
REFERENCE NO. TO INTERSECTION DETAILS
AIR & VACUUM RELEASE VALVE
4 X 2 1/2 FLUSHOUT

| DATE | DRAWN | CHECK'D | REVISIONS |
| --- | --- | --- | --- |
| APR. 01 | JF | | |
| DEC. 00 | JF | | |

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

WATERWORKS AND SEWER MAINTENANCE DIVISION

MARINA DEL REY WATER SYSTEM

| | |
| --- | --- |
| DATE: | OCTOBER 2000 |
| DRAWN BY | JF |
| CHECKED BY | PS |

MDR 9

# <u>Los Angeles County Estimated Average Daily Sewage Flows For Various Occupancies</u>
# <u>Appendix ii</u>

## Estimated Average Daily Sewage Flows for Various Occupancies

| Occupancy | Abbreviation | *Average daily flow |
|---|---|---|
| Apartment Buildings: | | |
| Bachelor or Single dwelling units | Apt | 100 gal/D.U. → 150 |
| 1 bedroom dwelling units | Apt | 150 gal/D.U. → 200 |
| 2 bedroom dwelling units | Apt | 200 gal/D.U. → 250 |
| 3 bedroom or more dwelling units | Apt | 250 gal/D.U. → use 300 GPD per SMD |
| Auditoriums, churches, etc. | Aud | 5 gal/seat |
| Automobile parking | P | 25 gal/1000 sq ft gross floor area |
| Bars, cocktails lounges, etc. | Bar | 20 gal/seat |
| Commercial Shops & Stores | CS | 100 gal/1000 sq ft gross floor area |
| Hospitals (surgical) | HS | 500 gal/bed |
| Hospitals (convalescent) | HC | 85 gal/bed |
| Hotels | H | 150 gal/room |
| Medical Buildings | MB | 300 gal/1000 sq ft gross floor area |
| Motels | M | 150 gal/unit |
| Office Buildings | Off | 200 gal/1000 sq ft gross floor area |
| Restaurants, cafeterias, etc. | R | 50 gal/seat |
| Schools: | | |
| Elementary or Jr. High | S | 10 gal/student |
| High Schools | HS | 15 gal/student |
| Universities or Colleges | U | 20 gal/student |
| College Dormitories | CD | 85 gal/student |

*Multiply the average daily flow by 2.5 to obtain the peak flow

### Zoning Coefficients

| Zone | Coefficient (cfs/Acre) |
|---|---|
| **Agriculture** ------------------------------- | **0.001** |
| **Residential+:** | |
| **R-1** ------------------------------------------- | **0.004** |
| **R-2** ------------------------------------------- | **0.008** |
| **R-3** ------------------------------------------- | **0.012** |
| **R-4** ------------------------------------------- | **0.016*** |
| **Commercial:** | |
| **C-1 through C-4** ------------------------- | **0.015*** |
| **Heavy Industrial:** | |
| **M1 through M-4** -------------------------- | **0.021*** |

***Individual building, commercial or industrial plant capacities shall be the determining factor when they exceed the coefficients shown**

**+ Use 0.001 (cfs/unit) for condominiums only**

# <u>Waterworks' Fire Flow Test Data</u>
# <u>Appendix iii</u>

FORM 196
Rev. 04/03

# COUNTY OF LOS ANGELES FIRE DEPARTMENT
## FIRE PREVENTION DIVISION

Fire Prevention Engineering
5823 Rickenbacker Road
Commerce, CA 90040
Telephone (323) 890-4125 Fax (323) 890-4129

## Information on Fire Flow Availability for Building Permit

**For All Buildings Other Than Single Family Dwellings (R-3)**

**INSTRUCTIONS:**

Complete parts I, II (A) when:
Verifying fire flow, fire hydrant location and fire hydrant size.

Complete parts I, II (A), & II (B) when:
For buildings equipped with fire sprinkler systems, and/or private on-site fire hydrants.

**PROJECT INFORMATION**
**(To Be Completed By Applicant)**

**PART I**

Building Address: Parcel 44- Marina Del Rey

City or Area: Los Angeles County

Nearest Cross Street: Bali Way, Admiralty Way, Mindanao Way

Distance of Nearest Cross Street: NA

Applicant: Breen Engineering Telephone: (310) 464-8404

Address: 1983 W. 190Th street

City: Torrance, Calif. 90504

Occupancy (Use of Building): Commercial Sprinklered: Yes [X] No [ ]

Type of Construction: Multiple Bldgs - The one with the most area is Type V-1 hour

Square Footage: 39,000 sf. Number of Stories: 2

Present Zoning: Specific Plan - Land use designations are: "Marine Commercial, Boat Storage, & Visitor Serving/Convenience Commercial."

G. M. Ziegler
Applicant's Signature

9/6/12
Date

**PART II-A** **INFORMATION ON FIRE FLOW AVAILABILITY**
**(To be completed by Water Purveyor)**

Location Fire hydrant is on Bali Way approximately 650-ft southwest from centerline of Admiralty Way

Hydrant Number ____

Distance from Nearest Property Line ____ Size of Hydrant 6 x 4 x 2.5 Size of Water main 8-inch

Static PSI 92 Residual PSI 72 Orifice size 2.5-inch Pitot 45psi

Fire Flow at 20 PSI 2500 gpm Duration 2-hr Flow Test Date / Time 9/5/2012 @12:55pm

---

Location Fire hydrant is on Mindanao Way approximately 740-ft southwest from centerline of Admiralty Way

Hydrant Number ____

Distance from Nearest Property Line ____ Size of Hydrant 6 x 4 x 2.5 Size of Water main 10-inch

Static PSI 95 Residual PSI 80 Orifice size 2.5-inch Pitot 58psi

Fire Flow at 20 PSI 3350 gpm Duration 2-hr Flow Test Date / Time 5/31/2012 @11:00am

---

Location ____

Hydrant Number ____

Distance from Nearest Property Line ____ Size of Hydrant ____ Size of Water main ____

Static PSI ____ Residual PSI ____ Orifice size ____ Pitot ____

Fire Flow at 20 PSI ____ Duration ____ Flow Test Date / Time ____

---

**PART II-B** **SPRINKLERED BUILDINGS/PRIVATE FIRE HYDRANTS ONLY**

Detector Location (check one) [X] Above Grade [ ] Below Grade [ ] Either

Backflow Protection Required (Fire Sprinklers/Private Hydrant) (check one) [X] Yes [ ] No

Minimum Type of Protection Required (check one) [ ] Single Check Detector Assembly

[ ] Double Check Detector Assembly [X] Reduced Pressure Principle Detector Assembly

---

Los Angeles County Waterworks Districts
Water Purveyor

Signature

9/6/2012
Date

Associate Civil Engineer (Kirk Allen)
Title

**This Information is Considered Valid for Twelve Months**

Fire Department approval of building plans shall be required prior to the issuance of a Building Permit by the jurisdictional Building Department. Any deficiencies in water systems will need to be resolved by the Fire Prevention Division only prior to this department's approval of building plans.

## APPENDIX 4.10.3

## Demolition and Hazardous Materials Reports

ANDERSEN ENVIRONMENTAL
5261 W. Imperial Highway, Los Angeles, CA 90045
Toll Free: (888) 705-6300 Tel: (310) 854-6300 Fax: (310) 854-0199

# Pre-Demolition Asbestos Assessment Report

PERFORMED AT

PIER 44
4601, 4625-4637 & 4695 Admiralty Way
13441 & 13445 Mindanao Way
13444 & 13446 Bali Way
Marina Del Rey, CA 90292

Project No.: 1207-784

PREPARED FOR

Pacific Marina Ventures, LLC
13737 Fiji Way, C-10
Marina Del Rey, CA 90292

August 24, 2012

# EXECUTIVE SUMMARY

Mr. Michael Pashaie of Pacific Marina Ventures, LLC (referred to hereunder as the client) retained Andersen Environmental to perform a pre-demolition assessment and sampling of suspect asbestos containing materials (ACM) that are to be disturbed during demolition activities of the seven structures located at 4601, 4625-4637 & 4695 Admiralty Way; 13441 & 13445 Mindanao Way and 13444 & 13446 Bali Way including a restroom building (otherwise known as Pier 44) in Marina del Rey, CA 90292 (referred to hereunder as subject property). The purpose of this assessment was to conduct bulk sampling in order to determine the presence or absence of ACM within each structure on the subject property. This report is a record of activities, observations, analytical results and recommendations performed to date.

**Findings**

The following materials were found to contain asbestos and are considered ACM:
**<u>4601 Admiralty Way</u>**

- None Detected

**<u>4625-4637 Admiralty Way</u>**

- Beige 12x12 Vinyl Floor Tile (Throughout)

**<u>4695 Admiralty Way</u>**

- None Detected

**<u>13441 Mindanao Way</u>**

- Beige 12x12 Vinyl Floor Tile and Black Mastic (Janitors Closet)

**<u>13445 Mindanao Way</u>**

- Beige 12x12 Vinyl Floor Tile and Black Mastic (Restrooms)
- Silver Duct Wrap (HVAC Room)
- White Duct Tape (HVAC Room)

**<u>13444 -13446 Bali Way & Restroom Outbuilding</u>**

- Roof Mastic (Restroom Outbuilding)

The following materials were presumed to contain asbestos and are considered ACM:
**<u>13444 -13446 Bali Way & Restroom Outbuilding</u>**

- Two Transite Pipes (Restroom Outbuilding)

The following materials were found to contain trace concentrations of asbestos and are considered ACCM:
**<u>13445 Mindanao Way</u>**

- Joint Compound (Throughout)
- Black Floor Tile Mastic (Laundry Room)

All of the above materials were found to be in good condition at the time of the assessment.

All other materials sampled in this assessment tested negative for asbestos.

Please refer to the attached table for a list of ACM / ACCM Homogeneous Materials, their locations and approximate quantities.

**Recommendations**

If materials found to contain asbestos and/or presumed to contain asbestos are going to be disturbed or removed; by law, they must first be abated and properly disposed of by a licensed and Cal/OSHA registered asbestos abatement contractor prior to any renovation or demolition activities.

It is highly recommended that abatement monitoring be performed by the asbestos consultant (Andersen Environmental) if asbestos abatement is to be performed while non-abatement persons (employees, tenants, other building occupants, or general public) are present in adjacent areas. Abatement monitoring included the collection of air samples in adjacent areas to demonstrate that asbestos fibers are not migrating out of the regulated areas. In addition to air sampling, the monitoring includes oversight of the abatement contractor to ensure that the work is being conducted in compliance with all applicable regulations and in accordance with the scope of work and abatement specifications. Such abatement monitoring serves to limit the legal liabilities of the building owner.

# METHODOLOGY

All samples were collected using a clean knife, chisel or the appropriate tools. Each sample was extracted carefully so as not to disturb adjacent materials while still penetrating through all layers of the material sampled. Each sample was sealed in the appropriate sized plastic zip lock bag and the bag then labeled with a unique identification number. The sample number, description and location was then recorded on a log and plotted on a floor plan of the structure or area. Sampling tools were cleaned after collecting each sample. Any excess dust or debris from the sample location was cleaned using a moistened cloth. Whenever possible, samples were collected from previously damaged portions of the material in order to minimize damage to the material.

A total of one hundred fifty nine (159) samples were submitted to LA Testing in Garden Grove, California. LA Testing is accredited under the NIST/NVLAP program for asbestos in bulk material by polarized light microscopy and the State of California for asbestos analysis. NIST/NVLAP lab code 101384-0.

The analyses of the samples in this report were performed using polarized light microscopy using the EPA method 600/R-93/116. The phase abundances provided are visually estimated and expressed as percent area. Total percentage of sample constituents may total greater than 100 due to trace amounts. The limit of detection for this analytical method is less than one percent. In multilayer samples, unless otherwise specified, the asbestos concentration is reported for the layer where asbestos is found. These results lie within the statistical limits of variability calculated for standard reference samples routinely analyzed in the laboratory. On a per sample basis, the accuracy and precision of the results depend on the type of sample and its asbestos content.

At the Client's discretion, four of the samples in this report were further analyzed using the 1,000 point count method. These analyses were performed using gravimetric matrix reduction and polarized light microscopy (PLM) in accordance with the EPA method 600/R-93/116 July 1993. The asbestos concentration was determined using the semi-quantitative point count method. On a per sample basis, the accuracy and precision of point count results are not known. The result should lie within the statistical limits of variability calculated for standard reference samples routinely analyzed in the laboratory using the point count method. The limit of detection for this analytical method is 0.25 percent using 400 points and 0.10 percent using 1000 points (visual area estimates).

## DEFINITIONS

Asbestos – includes Chrysotile (CH), Amosite (AM), Crocidolite (CR), Tremolite (TR), Anthophyllite (AN), Actinolite (AC) and any of these minerals that have been chemically treated and/or altered.

Asbestos Containing Material (ACM) – any material containing greater than one percent (>1%) asbestos. These materials are subject to all federal, state and local asbestos regulation.

Asbestos Containing Construction Material (ACCM) – any manufactured construction material containing greater than one tenth of one percent (>0.1%) asbestos (as defined by California's Department of Occupational Safety and Health). These materials are subject to all Cal-OSHA standards.

Bulk sample – a chunk of material which is sent to a laboratory to be tested for asbestos.

Damaged – a material that exhibits less than ten percent (10%) distributed damage or twenty five percent (25%) localized damage.

Demolition – wrecking or taking out of any load-supporting structural member and any related removing or stripping of asbestos material.

Disturbance – activities that disrupt the matrix of ACM, crumble or pulverize ACM or generate visible debris from ACM.

EPA – Environmental Protection Agency

Friable – a friable material is any material that can be crushed, crumbled or pulverized by hand pressure when dry.

Good condition – a material with no visible damage or deterioration, or exhibiting only very limited damage or deterioration.

High – Potential for contact – service workers work in the vicinity of the material more than once per week or the material is in a public area and accessible to building occupants.

High – Influence of vibration – loud motors or engines present, intrusive noises or easily sensed vibrations.

High – (air) Erosion potential – high velocity air movement such as in a fan room or elevator shaft.

Homogeneous area – an area of material that is uniform in color and texture.

Linear Feet – (LF) the length of a given material. Usually used to define a quantity of pipe insulation.

Low – Potential for contact – service workers work in the vicinity of the material less than once per month or the material is visible but not within reach of building occupants.

Low – Influence of vibration – no loud motors, engines, intrusive noises or sensed vibrations.

Low – (air) Erosion potential – no noticeable movement of air.

Moderate – Potential for contact – service workers work in the vicinity of the material once per month to once per week or the materials are in a room or office and accessible to the occupants.

Moderate – Influence of vibration – motors or engines present but not obtrusive or occasional loud sounds.

Moderate – (air) Erosion potential – noticeable movement of air such as an airshaft or ventilator air stream.

Non-friable – a non-friable material cannot be crushed, crumbled or pulverized by hand pressure.

OSHA – Occupational Safety and Health Administration

Polarized Light Microscopy (PLM) – the analysis used to determine the asbestos content of a material.

Presumed Asbestos Containing Material (PACM) – a material that is not analyzed but is presumed to contain asbestos, such as transite.

Procedure 5 – an approved alternative combination of techniques and/or engineering controls. Written approval from the Air Quality Management District (AQMD) must be obtained prior to the use of procedure 5 ACM removal activities. These procedures are usually implemented in instances where more than 100 square feet of friable asbestos material has been disturbed and emergency clean up activities are recommended.

Significantly damaged – a material exhibiting over ten percent (10%) distributed damage or twenty five percent (25%) localized damage.

Square feet – (SF) Used to quantify building materials.

## PROJECT DETAIL

### Introduction
Mr. Michael Pashaie of Pacific Marina Ventures, LLC (referred to hereunder as the client) retained Andersen Environmental to perform a pre-demolition assessment and sampling of suspect asbestos containing materials (ACM) that are to be disturbed during demolition activities of the seven structures located at 4601, 4625-4637 & 4695 Admiralty Way; 13441 & 13445 Mindanao Way and 13444 & 13446 Bali Way including a restroom building (otherwise known as Pier 44) in Marina del Rey, CA 90292 (referred to hereunder as subject property). The assessment was performed on August 1, 2 and 9, 2012, by Benjamin Curry a Certified Asbestos Consultant (Cert. No. 09-4549) and Freddy Torres, a Certified Asbestos Consultant (Cert. No. 10-4593).

### Scope of Work
The purpose of this assessment was to conduct bulk sampling in order to determine the presence or absence of ACM within the above referenced structures at the subject property. The scope of this assessment included reviewing any provided building records and/or previous investigation records, visually identifying homogeneous areas and functional spaces, collecting bulk samples of suspect ACM, interpreting the laboratory results and producing a written report of our findings and recommendations.

The sampling was performed in accordance with requirements of the following regulations:
- Asbestos Hazard Emergency Response Act (AHERA); 40 CFR 763 Subpart E
- Asbestos School Hazard Abatement Reauthorization Act (ASHARA); Section 206 of the Toxic Substance Control Act
- National Emissions Standards for Hazardous Air Pollutants (NESHAPS); 40 CFR 61 Subpart M.
- South Coast Air Quality Management District (SCAQMD) Rule 1403

This report is a record of activities, observations, analytical results and recommendations performed to date.

### Site Description
The subject property consists of four single story buildings and three two-story buildings. The buildings are of wood-framed construction with pitched and sit on concrete slab foundations. The exterior finishes include either wood siding or concrete masonry unit exterior walls. The interior finishes consist of drywall or plaster walls and ceilings, drop ceilings with acoustic ceiling tiles, and either vinyl composite tile, carpet or ceramic tile floors.

### Findings
The following materials were found to contain asbestos and are considered ACM:

**4601 Admiralty Way**
- None Detected

**4625-4637 Admiralty Way**
- Beige 12x12 Vinyl Floor Tile (Throughout)

**4695 Admiralty Way**
- None Detected

**<u>13441 Mindanao Way</u>**

- Beige 12x12 Vinyl Floor Tile and Black Mastic (Janitors Closet)

**<u>13445 Mindanao Way</u>**

- Beige 12x12 Vinyl Floor Tile and Black Mastic (Restrooms)
- Silver Duct Wrap (HVAC Room)
- White Duct Tape (HVAC Room)

**<u>13444 -13446 Bali Way & Restroom Outbuilding</u>**

- Roof Mastic (Restroom Outbuilding)

The following materials were presumed to contain asbestos and are considered ACM:
**<u>13444 -13446 Bali Way & Restroom Outbuilding</u>**

- Two Transite Pipes (Restroom Outbuilding)

The following materials were found to contain trace concentrations of asbestos and are considered ACCM:
**<u>13445 Mindanao Way</u>**

- Joint Compound (Throughout)
- Black Floor Tile Mastic (Laundry Room)

All of the above materials were found to be in good condition at the time of the assessment.

All other materials sampled in this assessment tested negative for asbestos.

Please refer to the attached table for a list of ACM / ACCM Homogeneous Materials, their locations and approximate quantities.

**Recommendations**

If materials found to contain asbestos and/or presumed to contain asbestos are going to be disturbed or removed; by law, they must first be abated and properly disposed of by a licensed and Cal/OSHA registered asbestos abatement contractor prior to any renovation or demolition activities.

It is highly recommended that abatement monitoring be performed by the asbestos consultant (Andersen Environmental) if asbestos abatement is to be performed while non-abatement persons (employees, tenants, other building occupants, or general public) are present in adjacent areas. Abatement monitoring included the collection of air samples in adjacent areas to demonstrate that asbestos fibers are not migrating out of the regulated areas. In addition to air sampling, the monitoring includes oversight of the abatement contractor to ensure that the work is being conducted in compliance with all applicable regulations and in accordance with the scope of work and abatement specifications. Such abatement monitoring serves to limit the legal liabilities of the building owner.

## LIMITATIONS

Andersen Environmental is committed to providing quality consulting services. However, asbestos survey work is not an exact science. The possibility of field and general conditions, beyond Andersen Environmental's control, that affect our work or that present a concern for the safety of our employees, our consultants, building occupants and the public at the site, and insurance constraints, requires that we qualify the services we provide with the following limitations:

The findings of this survey, opinions rendered, recommendations and conclusions provided in this survey report are only valid for a period of up to one year from the date of this survey report.

Reasonable effort is made by Andersen Environmental personnel to locate and sample all suspect materials. However, for any facility the existence of unique or concealed asbestos-containing materials and debris is a possibility. In addition, sampling and laboratory analysis constraints typically hinder the investigation. Andersen Environmental does not warrant, guarantee or profess to have the ability to locate or identify all asbestos-containing materials in a facility.

Confined spaces, and areas determined by Andersen Environmental's personnel as unsafe to access, are excluded from the scope of work.

Andersen Environmental does not employ professional cost estimators. Statements of probable construction cost or cost estimates prepared by Andersen Environmental represent Andersen Environmental's professional opinion of probable costs based upon current industry information. Actual costs may fluctuate due to several variables including, but not limited to, the time the work is performed, phasing, labor availability, quantity of work performed, product availability, specification requirements, and unforeseeable changes in the economy and asbestos regulations.

Andersen Environmental is not, and has no responsibility as, a generator, operator, treater, storer, transporter or disposer of hazardous materials or waste found or identified as a result of Andersen' work.

Andersen Environmental does not guarantee or warrant that the facility or workplace is safe, nor does Andersen Environmental's involvement in this property relieve the Client, building owner/operator or tenant of any continuing responsibility of providing a safe facility or workplace.

This report was based on those conditions observed on the day(s) the field evaluation was accomplished. In the event that changes in the nature of the property have occurred, or additional relevant information about the property is subsequently discovered, the findings and recommendations contained in this report may not be valid unless these changes and additional relevant information are reviewed and the conclusion of this report is modified and verified in writing.

In as such that no destructive investigation has been performed during the survey, the report may not reveal concealed asbestos-containing materials. Subsequently, additional investigation including construction documents review and/or destructive investigation is recommended as a precaution to prevent accidental exposure when construction or demolition is planned for this facility.

## SIGNATURES

Please do not hesitate to contact us should there be any questions or if additional services are necessary.

Reviewed by:

Ben Curry

Benjamin Curry
DOSH Certified Asbestos Consultant No. 09-4549
Senior Project Manager
Andersen Environmental

# APPENDICES

## Appendix I - HOMOGENEOUS MATERIALS LOCATION LIST

| Homogeneous Material No.. | Material Description | Material Location (Functional Space) | Total Quantity* |
|---|---|---|---|
| 1 | Beige 12x12 Vinyl Floor Tiles (Beneath carpet) 3% Chrysotile | Building 4625 – 4637 Admiralty Way Throughout 1st & 2nd Floors | 7,200 SF |
| 2 | Beige 12x12 Vinyl Floor Tiles & Black Mastic 2-5% Chrysotile | Building 13441, Janitors Closet | 140 SF |
| 3 | Beige 12x12 Vinyl Floor Tiles & Black Mastic 3-6% Chrysotile | Building 13445, Restrooms | 1,000 SF |
| 4 | Silver Duct Wrap Insulation 40-45% Chrysotile | Building 13445, HVAC Room | 300 SF |
| 5 | White Duct Tape | Building 13445, HVAC Room | 100 LF |
| 6 | Black Floor Tile Mastic 0.3% Chrysotile | Building 13445, Laundry Room | 120 SF |
| 7 | Drywall & Joint Compound 0.5% Chrysotile | Building 13445, Throughout | 7,400 SF |

| Homogeneous Material No.. | Material Description | Material Location (Functional Space) | Total Quantity* |
|---|---|---|---|
| 8 | Roof Mastic<br>8% Chrysotile | Bali Way Restroom Building, Roof | 10 SF |
| | Transite Pipe<br>Presumed | Bali Way Restroom Building, Roof | 6 LF |

* These quantities are only approximations.  The exact quantities should be measured by the abatement contractor during the bidding process.

## Appendix II – LABORATORY ANALYSIS RESULTS & CHAIN-OF-CUSTODY

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losalamitoslab@latesting.com

LA Testing Order: 331211344
CustomerID: 32ANDE85
CustomerPO:
ProjectID:

Attn: **Scott Myers**
**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4601 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 8112-1A<br>*331211344-0001* | JC / Office 1 - N | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1B<br>*331211344-0002* | JC / Entry Room - W | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1C<br>*331211344-0003* | JC / Office 2 - S | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-2A<br>*331211344-0004* | DW / Storage Room 1 | Tan<br>Fibrous<br>Homogeneous | 4% | Cellulose | 96% | Non-fibrous (other) | **None Detected** |
| 8112-2B<br>*331211344-0005* | DW / Storage Room 2 | White<br>Fibrous<br>Homogeneous | 4% | Cellulose | 96% | Non-fibrous (other) | **None Detected** |
| 8112-2C<br>*331211344-0006* | DW / Restroom - N | White<br>Fibrous<br>Homogeneous | 3% | Cellulose | 97% | Non-fibrous (other) | **None Detected** |
| 8112-3A<br>*331211344-0007* | 12x12 AC Tile / Entry Room | Tan/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-3B<br>*331211344-0008* | 12x12 AC Tile / Office 1 | Tan/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (19)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 16:06:50

**EMSL Analytical, Inc.**
**7916 Convoy Court,Building 4, Suite A, San Diego, CA 92111**
Phone/Fax: 858-499-1303 / (858) 499-1304
http://www.emsl.com sandiegolab@emsl.com

| | |
|---|---|
| EMSL Order: | 431201623 |
| CustomerID: | 32ANDE85 |
| CustomerPO: | |
| ProjectID: | |

Attn: **Ben Curry**
**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

| | |
|---|---|
| Phone: | (310) 854-6300 |
| Fax: | |
| Received: | 08/17/12 11:32 AM |
| Analysis Date: | 8/21/2012 |
| Collected: | |

Project: **REFERENCE PROJECT WITH ORDER ID 331211342 (1207-784/13445 MINDANAO WAY)**

# Test Report: Asbestos Analysis of Bulk Material via EPA 600/R-93/116. Quantitation using the 1,000 Point Count Procedure

| Sample | Description | Appearance | Non-Asbestos % Fibrous | Non-Asbestos % Non-Fibrous | Asbestos % Type |
|---|---|---|---|---|---|
| 1A<br>*431201623-0001* | | Beige<br>Non-Fibrous<br>Homogeneous | | 99.50% Non-fibrous (other) | **0.50% Chrysotile** |
| 1B<br>*431201623-0002* | | Beige<br>Non-Fibrous<br>Homogeneous | | 99.60% Non-fibrous (other) | **0.40% Chrysotile** |
| 6A MASTIC<br>*431201623-0003* | | Black/Beige<br>Non-Fibrous<br>Heterogeneous | | 99.70% Non-fibrous (other) | **0.30% Chrysotile** |
| 6B MASTIC<br>*431201623-0004* | | Black/Beige<br>Non-Fibrous<br>Heterogeneous | | 99.80% Non-fibrous (other) | **0.20% Chrysotile** |

Analyst(s)
*Rebecca Luu (4)*

Michelle LaVallee, Laboratory Manager
or other approved signatory



Initial report from 08/21/2012 13:19:44

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LA Testing Order: 331211344
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ProjectID:

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**Andersen Environmental**
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**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4601 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 8112-3C<br>*331211344-0009* | 12x12 AC Tile / Office 3 | Tan/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-4A<br>*331211344-0010* | 2x4 AC Panel / Restroom - N | Tan/White<br>Fibrous<br>Heterogeneous | 40%<br>20% | Cellulose<br>Min. Wool | 30%<br>10% | Non-fibrous (other)<br>Perlite | **None Detected** |
| 8112-4B<br>*331211344-0011* | 2x4 AC Panel / Restroom - S | Tan/White<br>Fibrous<br>Heterogeneous | 40%<br>20% | Cellulose<br>Min. Wool | 30%<br>10% | Non-fibrous (other)<br>Perlite | **None Detected** |
| 8112-5A<br>*331211344-0012* | Beige 12x12 VFT / Restroom - N | Gray<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-5B<br>*331211344-0013* | Beige 12x12 VFT / Restroom - E | Gray<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-6A<br>*331211344-0014* | Blk Vinyl Cove Base / Office 1 - S | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-6B-Cove Base<br>*331211344-0015* | Blk Vinyl Cove Base / Office 2 - N | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-6B-Mastic<br>*331211344-0015A* | Blk Vinyl Cove Base / Office 2 - N | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (19)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 16:06:50

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LA Testing Order: 331211344
CustomerID: 32ANDE85
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Attn: **Scott Myers**
**Andersen Environmental**
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**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4601 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 8112-7A<br>*331211344-0016* | Brn Asphault Roof Shingles / Roof - E | Brown/Black Fibrous Heterogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 8112-7B<br>*331211344-0017* | Brn Asphault Roof Shingles / Roof - S | Brown/Black Fibrous Heterogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 8112-7C<br>*331211344-0018* | Brn Asphault Roof Shingles / Roof - W | Fibrous Heterogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (19)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 16:06:50

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|---|---|
| LA Testing Order: | 331211345 |
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| CustomerPO: | |
| ProjectID: | |

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**Andersen Environmental**
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| Phone: | (310) 854-6300 |
| Fax: | |
| Received: | 08/06/12 8:00 AM |
| Analysis Date: | 8/8/2012 |
| Collected: | |

Project: **1207-784 / 4625 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **%** | **Fibrous** | **%** | **Non-Fibrous** | **% Type** |
| 3112-1A<br>*331211345-0001* | JC / 4625 Main Floor - N | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-1B<br>*331211345-0002* | JC / 4625 A Main Floor - S | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-1C<br>*331211345-0003* | JC / 4633 Main Floor - W | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-1D<br>*331211345-0004* | JC / 4637 Main Floor - N | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-1E<br>*331211345-0005* | JC / 4635 Main Floor - E | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-1F<br>*331211345-0006* | JC / Men's Restroom - N | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-1G<br>*331211345-0007* | JC / Women's Restroom - S | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-2A<br>*331211345-0008* | DW / 4627 Restroom - N | Tan<br>Fibrous<br>Homogeneous | 3% | Cellulose | 97% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (31)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Initial report from 08/08/2012 15:58:50

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Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4625 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 3112-2B<br>*331211345-0009* | DW / 4637 Closet - N | White<br>Fibrous<br>Homogeneous | 4% | Cellulose | 96% | Non-fibrous (other) | **None Detected** |
| 3112-2C<br>*331211345-0010* | DW / 4625 A - N | White<br>Fibrous<br>Homogeneous | 5% | Cellulose | 95% | Non-fibrous (other) | **None Detected** |
| 3112-3A<br>*331211345-0011* | 12x12 AC Tile / 4637 Admin Main Room | Brown/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 3112-3B<br>*331211345-0012* | 12x12 AC Tile / 4625 Admin Main Room | Brown/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 3112-3C<br>*331211345-0013* | 12x12 AC Tile / 4629 Admin Main Room | Brown/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 3112-4A-Floor Tile<br>*331211345-0014* | Bge/Bl 12x12 VFT / 4627 Admin Bathroom | Green<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-4A-Mastic<br>*331211345-0014A* | Bge/Bl 12x12 VFT / 4627 Admin Bathroom | Yellow<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-4B-Floor Tile<br>*331211345-0015* | Bge/Bl 12x12 VFT / 4627 Admin Bathroom | Brown<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (31)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 15:58:50

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Attn: **Scott Myers**
**Andersen Environmental**
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**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4625 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 3112-4B-Mastic<br>*331211345-0015A* | Bge/Bl 12x12 VFT / 4627 Admin Bathroom | Yellow<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-5A-Floor Tile<br>*331211345-0016* | Bge 12x12 VFT / 4625 Admin Beneath Closet | Beige<br>Non-Fibrous<br>Homogeneous | | | 97% | Non-fibrous (other) | **3% Chrysotile** |
| 3112-5A-Mastic<br>*331211345-0016A* | Bge 12x12 VFT / 4625 Admin Beneath Closet | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-5B-Floor Tile<br>*331211345-0017* | Bge 12x12 VFT / 4625 Admin Beneath Closet | Beige<br>Non-Fibrous<br>Homogeneous | | | 97% | Non-fibrous (other) | **3% Chrysotile** |
| 3112-5B-Mastic<br>*331211345-0017A* | Bge 12x12 VFT / 4625 Admin Beneath Closet | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-6A<br>*331211345-0018* | Carpet Glue / 4625 Admin Beneath Carpet - W | Black/Yellow<br>Non-Fibrous<br>Heterogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-6B<br>*331211345-0019* | Carpet Glue / 4625 Admin Beneath Carpet - E | Yellow<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 3112-7A<br>*331211345-0020* | Roof Mastic / Roof - N | Gray/Black<br>Non-Fibrous<br>Homogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (31)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

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| | |
|---|---|
| LA Testing Order: | 331211345 |
| CustomerID: | 32ANDE85 |
| CustomerPO: | |
| ProjectID: | |

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| Received: | 08/06/12 8:00 AM |
| Analysis Date: | 8/8/2012 |
| Collected: | |

Project: **1207-784 / 4625 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 3112-7B<br>*331211345-0021* | Roof Mastic / Roof - Center | Gray/Black Fibrous Homogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |
| 3112-7C<br>*331211345-0022* | Roof Mastic / Roof - S | Gray/Black Fibrous Homogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |
| 3112-8A<br>*331211345-0023* | Gravel Roof / Roof - N | Black Fibrous Homogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 3112-8B<br>*331211345-0024* | Gravel Roof / Roof - W | Black Fibrous Homogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 3112-8C<br>*331211345-0025* | Gravel Roof / Roof - E | Black Fibrous Homogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 3112-9A<br>*331211345-0026* | Grey Rolled On Roofing / Storage Roof - E | Gray/Black Fibrous Heterogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |
| 3112-9B<br>*331211345-0027* | Grey Rolled On Roofing / Storage Roof - E | Gray/Black Fibrous Heterogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |

Analyst(s)

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Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4695 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **%** | **Fibrous** | **%** | **Non-Fibrous** | **% Type** |
| 8112-1A<br>*331211316-0001* | Wall Board / Main Floor - N | Brown/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-1B<br>*331211316-0002* | Wall Board / Main Floor - S | Brown/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-1C<br>*331211316-0003* | Wall Board / Main Floor - E | Brown/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-2A<br>*331211316-0004* | 12x12 AC Tile / Main Floor | Brown/White<br>Fibrous<br>Homogeneous | 98% | Cellulose | 2% | Non-fibrous (other) | **None Detected** |
| 8112-2B<br>*331211316-0005* | 12x12 AC Tile / Main Floor | Tan/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-2C<br>*331211316-0006* | 12x12 AC Tile / Storage Room | Tan/White<br>Fibrous<br>Heterogeneous | 95% | Cellulose | 5% | Non-fibrous (other) | **None Detected** |
| 8112-3A-Cove Base<br>*331211316-0007* | Beige Vinyl Cove Base / Main Floor - E | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-3A-Mastic<br>*331211316-0007A* | Beige Vinyl Cove Base / Main Floor - E | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |

Analyst(s)
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Samples analyzed by EMSL Analytical, Inc. San Diego, CA

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Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 4695 Admiralty Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| Sample | Description | Appearance | Non-Asbestos % | Fibrous | % | Non-Fibrous | Asbestos % Type |
|---|---|---|---|---|---|---|---|
| 8112-3B-Cove Base *331211316-0008* | Beige Vinyl Cove Base / RR - S | White Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-3B-Mastic *331211316-0008A* | Beige Vinyl Cove Base / RR - S | Beige Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-4A *331211316-0009* | Roof Mastic / Roof - N | Gray/Black Fibrous Homogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |
| 8112-4B *331211316-0010* | Roof Mastic / Roof - S | Gray/Black Fibrous Homogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | **None Detected** |
| 8112-5A *331211316-0011* | Brn Asphault Roof Shingles / Roof - E | Brown/Black Fibrous Heterogeneous | 25% | Cellulose | 75% | Non-fibrous (other) | **None Detected** |
| 8112-5B *331211316-0012* | Brn Asphault Roof Shingles / Roof - S | Brown/Black Fibrous Heterogeneous | 25% | Cellulose | 75% | Non-fibrous (other) | **None Detected** |
| 8112-5C *331211316-0013* | Brn Asphault Roof Shingles / Roof - W | Brown/Black Fibrous Heterogeneous | 20% | Cellulose | 80% | Non-fibrous (other) | **None Detected** |

Analyst(s)
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Collected:

Project: **1207-784 / 13441 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| Sample | Description | Appearance | Non-Asbestos % Fibrous | Non-Asbestos % Non-Fibrous | Asbestos % Type |
|---|---|---|---|---|---|
| 8112-1A<br>*331211343-0001* | JC / Seamark Office 1 - N | White<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-1B<br>*331211343-0002* | JC / Seamark Storage Closet - E | White<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-1C<br>*331211343-0003* | JC / Janitor's Storage - N | White<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-2A<br>*331211343-0004* | DW / Seamark Storage Closet - E | White<br>Fibrous<br>Homogeneous | 3% Cellulose<br><1% Glass | 97% Non-fibrous (other) | **None Detected** |
| 8112-2B<br>*331211343-0005* | DW / Seamark Office 2 - W | White<br>Fibrous<br>Homogeneous | 3% Cellulose<br><1% Glass | 97% Non-fibrous (other) | **None Detected** |
| 8112-2C<br>*331211343-0006* | DW / Janitor's Storage - N | White<br>Fibrous<br>Homogeneous | 3% Cellulose<br><1% Glass | 97% Non-fibrous (other) | **None Detected** |
| 8112-3A-Floor Tile<br>*331211343-0007* | Bl 12x12 VFT / Seamark Storage Closet - E | Blue<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-3A-Mastic<br>*331211343-0007A* | Bl 12x12 VFT / Seamark Storage Closet - E | Yellow<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |

Analyst(s)
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Project: **1207-784 / 13441 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | Asbestos |
|---|---|---|---|---|---|
| Sample | Description | Appearance | % Fibrous | % Non-Fibrous | % Type |
| 8112-3B-Floor Tile<br>*331211343-0008* | Bl 12x12 VFT / Seamark Storage Closet - S | Blue<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-3B-Mastic<br>*331211343-0008A* | Bl 12x12 VFT / Seamark Storage Closet - S | Yellow<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-4A-Floor Tile<br>*331211343-0009* | Bge 12x12 VFT / Janitor's Storage Closet - N | Tan<br>Non-Fibrous<br>Homogeneous | | 98% Non-fibrous (other) | **2% Chrysotile** |
| 8112-4A-Mastic<br>*331211343-0009A* | Bge 12x12 VFT / Janitor's Storage Closet - N | Black<br>Non-Fibrous<br>Homogeneous | | 95% Non-fibrous (other) | **5% Chrysotile** |
| 8112-4B-Floor Tile<br>*331211343-0010* | Bge 12x12 VFT / Janitor's Storage Closet - S | Tan<br>Non-Fibrous<br>Homogeneous | | 98% Non-fibrous (other) | **2% Chrysotile** |
| 8112-4B-Mastic<br>*331211343-0010A* | Bge 12x12 VFT / Janitor's Storage Closet - S | Black<br>Non-Fibrous<br>Homogeneous | | 96% Non-fibrous (other) | **4% Chrysotile** |
| 8112-5A<br>*331211343-0011* | Bl Vinyl Cove Base / Seamark Storage Closet - S | Black<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-6A-Finish Coat<br>*331211343-0012* | Stucco / Ext. - W | Cream<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (24)*

Derrick Tanner, Laboratory Manager
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Initial report from 08/08/2012 16:31:56

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Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 13441 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| Sample | Description | Appearance | Non-Asbestos % Fibrous | Non-Asbestos % Non-Fibrous | Asbestos % Type |
|---|---|---|---|---|---|
| 8112-6A-Base Coat *331211343-0012A* | Stucco / Ext. - W | Gray Non-Fibrous Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-6B-Finish Coat *331211343-0013* | Stucco / Ext. - S | Cream Non-Fibrous Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-6B-Base Coat *331211343-0013A* | Stucco / Ext. - S | Gray Non-Fibrous Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-6C-Finish Coat *331211343-0014* | Stucco / Ext. - E | Cream Non-Fibrous Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-6C-Base Coat *331211343-0014A* | Stucco / Ext. - E | Gray Non-Fibrous Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-7A *331211343-0015* | Grey Rolled On Roofing / Roof - N | Gray/Black Fibrous Heterogeneous | 8% Synthetic | 92% Non-fibrous (other) | **None Detected** |
| 8112-7B *331211343-0016* | Grey Rolled On Roofing / Roof - S | Gray/Black Fibrous Heterogeneous | 8% Synthetic | 92% Non-fibrous (other) | **None Detected** |
| 8112-7C *331211343-0017* | Grey Rolled On Roofing / Roof - E | Gray/Black Fibrous Heterogeneous | | 100% Non-fibrous (other) | **None Detected** |

Analyst(s)
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Initial report from 08/08/2012 16:31:56

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Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 13445 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| Sample | Description | Appearance | Non-Asbestos % Fibrous | | Non-Asbestos % Non-Fibrous | | Asbestos % Type |
|---|---|---|---|---|---|---|---|
| 8112-1A<br>*331211342-0001* | JC / 2nd Floor Bar - W | Beige Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **<1% Chrysotile** |
| 8112-1B<br>*331211342-0002* | JC / 2nd Floor Storage Room - N | Beige Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **<1% Chrysotile** |
| 8112-1C<br>*331211342-0003* | JC / 2nd Floor Kitchen - E | White Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1D<br>*331211342-0004* | JC / 2nd Floor Kitchen - W | White Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1E<br>*331211342-0005* | JC / 1st Floor Laundry - W | White Non-Fibrous Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-2A<br>*331211342-0006* | DW / 1st Floor HVAC Room - W | Beige Fibrous Homogeneous | 5% | Cellulose | 95% | Non-fibrous (other) | **None Detected** |
| 8112-2B<br>*331211342-0007* | DW / 1st Floor Laundry - E | White Fibrous Homogeneous | 4% | Cellulose | 96% | Non-fibrous (other) | **None Detected** |
| 8112-2C<br>*331211342-0008* | DW / 2nd Floor Kitchen - W | Tan Fibrous Homogeneous | 3%<br><1% | Cellulose<br>Glass | 97% | Non-fibrous (other) | **None Detected** |

Analyst(s)
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Initial report from 08/08/2012 15:52:43

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Project: **1207-784 / 13445 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos | |
|---|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % | Type |
| 8112-3A<br>*331211342-0009* | Corr Heating Duct Insulation / 1st Floor HVAC | Gray/Silver<br>Fibrous<br>Homogeneous | | | 60% | Non-fibrous (other) | **40%** | **Chrysotile** |
| 8112-3B<br>*331211342-0010* | Corr Heating Duct Insulation / 1st Floor HVAC | Gray/Silver<br>Fibrous<br>Heterogeneous | | | 55% | Non-fibrous (other) | **45%** | **Chrysotile** |
| 8112-4A<br>*331211342-0011* | Corr Heating Duct Insulation Tape / 1st Floor HVAC | Gray<br>Fibrous<br>Homogeneous | | | 60% | Non-fibrous (other) | **40%** | **Chrysotile** |
| 8112-4B<br>*331211342-0012* | Corr Heating Duct Insulation Tape / 1st Floor HVAC | Gray<br>Fibrous<br>Homogeneous | | | 55% | Non-fibrous (other) | **45%** | **Chrysotile** |
| 8112-5A-Floor Tile<br>*331211342-0013* | Bge Pebble 12x12 VFT / Men's RR - N | Gray<br>Non-Fibrous<br>Homogeneous | | | 97% | Non-fibrous (other) | **3%** | **Chrysotile** |
| 8112-5A-Mastic<br>*331211342-0013A* | Bge Pebble 12x12 VFT / Men's RR - N | Black<br>Non-Fibrous<br>Homogeneous | | | 94% | Non-fibrous (other) | **6%** | **Chrysotile** |
| 8112-6A-Floor Tile<br>*331211342-0014* | Bge Speck 12x12 VFT / Laundry - N | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | | **None Detected** |
| 8112-6A-Mastic<br>*331211342-0014A* | Bge Speck 12x12 VFT / Laundry - N | Black/Beige<br>Non-Fibrous<br>Heterogeneous | | | 100% | Non-fibrous (other) | **<1%** | **Chrysotile** |

Analyst(s)
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Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 15:52:43

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Project: **1207-784 / 13445 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos | |
|---|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % | Type |
| 8112-6B-Floor Tile<br>*331211342-0015* | Bge Speck 12x12 VFT / Laundry - S | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | | **None Detected** |
| 8112-6B-Mastic<br>*331211342-0015A* | Bge Speck 12x12 VFT / Laundry - S | Black/Beige<br>Non-Fibrous<br>Heterogeneous | | | 100% | Non-fibrous (other) | **<1%** | **Chrysotile** |
| 8112-7A<br>*331211342-0016* | Bge Square SVF / 2nd Floor Kitchen - N | Gray/Beige<br>Fibrous<br>Heterogeneous | 15%<br><1% | Cellulose<br>Glass | 85% | Non-fibrous (other) | | **None Detected** |
| 8112-7B<br>*331211342-0017* | Bge Square SVF / 2nd Floor Kitchen - S | Gray/Beige<br>Fibrous<br>Heterogeneous | 15% | Cellulose | 85% | Non-fibrous (other) | | **None Detected** |
| 8112-8A-Cove Base<br>*331211342-0018* | Grey Vinyle Cove Base / 2nd Floor Kitchen - N | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | | **None Detected** |
| 8112-8A-Mastic<br>*331211342-0018A* | Grey Vinyle Cove Base / 2nd Floor Kitchen - N | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | | **None Detected** |
| 8112-8B-Cove Base<br>*331211342-0019* | Grey Vinyle Cove Base / 2nd Floor Kitchen - S | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | | **None Detected** |

Analyst(s)
*Rebecca Luu (27)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Initial report from 08/08/2012 15:52:43

**LA Testing**
**11652 Knott Street Unit F5, Garden Grove, CA 92841**
Phone/Fax: (714) 828-4999 / (714) 828-4944
losalamitoslab@latesting.com

LA Testing Order: 331211342
CustomerID: 32ANDE85
CustomerPO:
ProjectID:

Attn: **Scott Myers**
**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected:

Project: **1207-784 / 13445 Mindanao Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 8112-9A-Cove Base<br>*331211342-0020* | Blk Vinyl Cove Base / 2nd Floor Bar - E | Black<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-9A-Mastic<br>*331211342-0020A* | Blk Vinyl Cove Base / 2nd Floor Bar - E | Yellow<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-10A-Cove Base<br>*331211342-0021* | Blk Vinyl Cove Base / 2nd Floor Laundry - W | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-10A-Mastic<br>*331211342-0021A* | Blk Vinyl Cove Base / 2nd Floor Laundry - W | Yellow<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (27)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Initial report from 08/08/2012 15:52:43

**LA Testing**
**520 Mission Street, South Pasadena, CA 91030**
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.latesting.com pasadenalab@latesting.com

LA Testing Order: 321213377
CustomerID: 32ANDE85
CustomerPO:
ProjectID:

Attn: **Ben Curry**
**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/08/12 2:15 PM
Analysis Date: 8/11/2012
Collected: 8/8/2012

Project: **1207-784 Pier 44**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **%** | **Fibrous** | **%** | **Non-Fibrous** | **% Type** |
| 101<br>*321213377-0001* | Roof core build 13445 | Gray/Black Fibrous Heterogeneous | 10%<br>5% | Cellulose<br>Glass | 85% | Non-fibrous (other) | **None Detected** |
| 102<br>*321213377-0002* | Roof core build 13445 | Gray/Black Fibrous Heterogeneous | 10% | Synthetic | 90% | Non-fibrous (other) | **None Detected** |
| 103<br>*321213377-0003* | Roof core build 13445 | Gray/Black Fibrous Heterogeneous | 10%<br>5% | Synthetic<br>Glass | 85% | Non-fibrous (other) | **None Detected** |
| 104<br>*321213377-0004* | Roof mastic build 13445 | Black Fibrous Heterogeneous | 10% | Cellulose | 90% | Non-fibrous (other) | **None Detected** |
| 105<br>*321213377-0005* | Roof mastic build 13445 | Gray/Black Fibrous Heterogeneous | 10% | Cellulose | 90% | Non-fibrous (other) | **None Detected** |
| 106<br>*321213377-0006* | Roof mastic build 13445 | Gray/Black Fibrous Heterogeneous | 10% | Cellulose | 90% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Olivia Santiago (6)*

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory



Initial report from 08/11/2012 14:31:29

**LA Testing**
**11652 Knott Street Unit F5, Garden Grove, CA 92841**
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LA Testing Order: 331211347
CustomerID: 32ANDE85
CustomerPO:
ProjectID:

Attn: **Scott Myers**
**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected: 8/1/2012

Project: **1207-784 / 13444 Bali Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **%** | **Fibrous** | **%** | **Non-Fibrous** | **% Type** |
| 8112-1A<br>*331211347-0001* | Joint Compound 1st Floor Mens RR | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1B<br>*331211347-0002* | Joint Compound 1st Floor Storage | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1C<br>*331211347-0003* | Joint Compound 1st Floor Entry | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1D<br>*331211347-0004* | Joint Compound 2nd Floor North | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1E<br>*331211347-0005* | Joint Compound 2nd Floor Kitchen East | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1F<br>*331211347-0006* | Joint Compound 2nd Floor South | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-1G<br>*331211347-0007* | Joint Compound 1st Floor South Hallway | White<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-2A<br>*331211347-0008* | Drywall 1st Floor Storage | White<br>Fibrous<br>Homogeneous | 5% | Cellulose | 95% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (37)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Initial report from 08/08/2012 15:57:02

**LA Testing**
**11652 Knott Street Unit F5, Garden Grove, CA 92841**
Phone/Fax: (714) 828-4999 / (714) 828-4944
losalamitoslab@latesting.com

| | |
|---|---|
| LA Testing Order: | 331211347 |
| CustomerID: | 32ANDE85 |
| CustomerPO: | |
| ProjectID: | |

Attn: **Scott Myers**
**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

| | |
|---|---|
| Phone: | (310) 854-6300 |
| Fax: | |
| Received: | 08/06/12 8:00 AM |
| Analysis Date: | 8/8/2012 |
| Collected: | 8/1/2012 |

Project: **1207-784 / 13444 Bali Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| Sample | Description | Appearance | Non-Asbestos % Fibrous | Non-Asbestos % Non-Fibrous | Asbestos % Type |
|---|---|---|---|---|---|
| 8112-2B<br>*331211347-0009* | Drywall 1st Floor Mens RR | White<br>Fibrous<br>Homogeneous | 5% Cellulose | 95% Non-fibrous (other) | **None Detected** |
| 8112-2C<br>*331211347-0010* | Drywall 2nd Floor North | White<br>Fibrous<br>Homogeneous | 4% Cellulose | 96% Non-fibrous (other) | **None Detected** |
| 8112-3A-Finish Coat<br>*331211347-0011* | Plaster 2nd Floor Kitchen | White<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-3A-Base Coat<br>*331211347-0011A* | Plaster 2nd Floor Kitchen | Beige<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-3B-Finish Coat<br>*331211347-0012* | Plaster 2nd Floor Kitchen | White<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-3B-Base Coat<br>*331211347-0012A* | Plaster 2nd Floor Kitchen | Beige<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |
| 8112-3C-Finish Coat<br>*331211347-0013* | Plaster HVAC Closet | Beige<br>Non-Fibrous<br>Homogeneous | | 100% Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (37)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 15:57:02

**LA Testing**
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LA Testing Order: 331211347
CustomerID: 32ANDE85
CustomerPO:
ProjectID:

Attn: **Scott Myers**
**Andersen Environmental**
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**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected: 8/1/2012

Project: **1207-784 / 13444 Bali Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| Sample | Description | Appearance | Non-Asbestos % Fibrous | | Non-Asbestos % Non-Fibrous | | Asbestos % Type |
|---|---|---|---|---|---|---|---|
| 8112-3C-Base Coat<br>*331211347-0013A* | Plaster HVAC Closet | Tan<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-3D-Finish Coat<br>*331211347-0014* | Plaster HVAC Closet | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-3D-Base Coat<br>*331211347-0014A* | Plaster HVAC Closet | Tan<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-3E-Finish Coat<br>*331211347-0015* | Plaster HVAC Closet | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-3E-Base Coat<br>*331211347-0015A* | Plaster HVAC Closet | Tan<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-4A<br>*331211347-0016* | Beige VSF 1st Floor Mens Restroom | Gray/Tan<br>Fibrous<br>Heterogeneous | 15%<br><1% | Cellulose<br>Glass | 85% | Non-fibrous (other) | **None Detected** |
| 8112-4B<br>*331211347-0017* | Beige VSF 1st Floor Storage | Gray/Tan<br>Fibrous<br>Heterogeneous | 15%<br><1% | Cellulose<br>Glass | 85% | Non-fibrous (other) | **None Detected** |
| 8112-5A<br>*331211347-0018* | Brown VCB 1st Floor South Hallway | Brown<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |

Analyst(s)
*Rebecca Luu (37)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Initial report from 08/08/2012 15:57:02

**LA Testing**
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LA Testing Order: 331211347
CustomerID: 32ANDE85
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ProjectID:

Attn: **Scott Myers**
**Andersen Environmental**
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**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected: 8/1/2012

Project: **1207-784 / 13444 Bali Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **%** | **Fibrous** | **%** | **Non-Fibrous** | **% Type** |
| 8112-5B<br>*331211347-0019* | Brown VCB 2nd Floor North | Brown<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-6A<br>*331211347-0020* | Stucco Ext South | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-6B<br>*331211347-0021* | Stucco Ext East | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-6C<br>*331211347-0022* | Stucco Ext West | Beige<br>Non-Fibrous<br>Homogeneous | | | 100% | Non-fibrous (other) | **None Detected** |
| 8112-7A<br>*331211347-0023* | Roof Mastic Main Bldg Roof North | Gray/Black<br>Fibrous<br>Homogeneous | 25% | Cellulose | 75% | Non-fibrous (other) | **None Detected** |
| 8112-7B<br>*331211347-0024* | Roof Mastic Main Bldg Roof South | Gray/Black<br>Fibrous<br>Homogeneous | 25% | Cellulose | 75% | Non-fibrous (other) | **None Detected** |
| 8112-7C<br>*331211347-0025* | Roof Mastic Restroom Bldg Roof East | Gray/Black<br>Fibrous<br>Homogeneous | | | 92% | Non-fibrous (other) | **8% Chrysotile** |
| 8112-7D<br>*331211347-0026* | Roof Mastic Restroom Bldg Roof Wesr | Gray/Black<br>Fibrous<br>Homogeneous | | | 92% | Non-fibrous (other) | **8% Chrysotile** |

Analyst(s)
*Rebecca Luu (37)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Samples analyzed by EMSL Analytical, Inc. San Diego, CA

Initial report from 08/08/2012 15:57:02

**LA Testing**
**11652 Knott Street Unit F5, Garden Grove, CA 92841**
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LA Testing Order: 331211347
CustomerID: 32ANDE85
CustomerPO:
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**Andersen Environmental**
**5261 West Imperial Highway**
**Los Angeles, CA 90045**

Phone: (310) 854-6300
Fax:
Received: 08/06/12 8:00 AM
Analysis Date: 8/8/2012
Collected: 8/1/2012

Project: **1207-784 / 13444 Bali Way**

# Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

| | | | Non-Asbestos | | | | Asbestos |
|---|---|---|---|---|---|---|---|
| Sample | Description | Appearance | % | Fibrous | % | Non-Fibrous | % Type |
| 8112-8A<br>*331211347-0027* | Asphalt Roof Shingles Main Bldg Roof South | Gray/Black Fibrous Heterogeneous | 8% | Glass | 92% | Non-fibrous (other) | **None Detected** |
| 8112-8B<br>*331211347-0028* | Asphalt Roof Shingles Main Bldg Roof East | Brown/Black Fibrous Heterogeneous | 8% | Glass | 92% | Non-fibrous (other) | **None Detected** |
| 8112-8C<br>*331211347-0029* | Asphalt Roof Shingles Main Bldg Roof Center | Brown/Black Fibrous Heterogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 8112-9A<br>*331211347-0030* | Asphalt Roof Shingles Restroom Bldg Roof East | Gray/Black Fibrous Heterogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |
| 8112-9B<br>*331211347-0031* | Asphalt Roof Shingles Restroom Bldg Roof Center | Gray/Black Fibrous Heterogeneous | 8% | Glass | 92% | Non-fibrous (other) | **None Detected** |
| 8112-9C<br>*331211347-0032* | Asphalt Roof Shingles Restroom Bldg Roof West | Gray/Black Fibrous Heterogeneous | 10% | Glass | 90% | Non-fibrous (other) | **None Detected** |

Analyst(s)

*Rebecca Luu (37)*

Derrick Tanner, Laboratory Manager
or other approved signatory



Initial report from 08/08/2012 15:57:02

#33121 1344

1211344

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

| Turn Around Time - (Circle) *Please select based on laboratory being used | 3hr | 6hr | 24hr | 48hr | 72hr | Standard |
|---|---|---|---|---|---|---|

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4601 Admiralty Way | Freddy Torres | 18 | 8-1-2012 | 1 | Of | 2 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-1A | Joint Compound Office 1 North %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 1B | Entry Room West %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1C | Office 2 South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2A | Drywall Storage Room 1 %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2B | Storage Room 2 %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2C | Restroom North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3A | 12x12 Acoustic Ceiling ~~Panel~~ Tile Entry Room %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3B | Office 1 %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3C | Office 3 %RH: Temp: | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Freddy Torres 8-2-12 | DB 8/6/12 800AM |
| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Cum |

5261 West Imperial Hwy Los Angeles, CA 90045, Ph (310) 854-6300, Fax (310) 854-0199

#331211344

331211344

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

| Turn Around Time - (Circle) *Please select based on laboratory being used | 3hr | 6hr | 24hr | 48hr | 72hr |
|---|---|---|---|---|---|
| | Standard | | | | |

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4601 Admiralty Way | Freddy Torres | 18 | 8-1-2012 | 2 | Of | 2 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-4A | 2x4 Acoustic Ceiling Panel Restroom North %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 4B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5A | Beige 12x12 Vinyl Floor Tile Restroom North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5B | East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6A | Black Vinyl Cove Base Office 1 South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6B | Office 2 North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7A | Brown Asphault Roof Shingles Roof East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7C | West %RH: Temp: | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Freddy Torres 8-2-12 | |
| **Relinquished By (Print & Sign) (Date & Time)** | **Received By (Print & Sign) (Date & Time)** |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Cory |

#3 3 1 2 1 1 1 3 4 5

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4625 Admiralty Way | Freddy Torres | 27 | 8-1-2012 | 1 | Of | 3 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8-1-12-1A | Joint Compound 4625 Main Floor North %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 1B | 4625 A South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1C | 4633 West %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1D | 4637 North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1E | 4635 East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1F | Men's Restroom North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1G | Women's Restroom South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2A | Drywall 4627 Restroom %RH: Temp: North | | | | Analysis Type: Serial No.: |
| 2B | 4637 Closet %RH: Temp: North | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Freddy Torres 8-2-12 | DB 8/6/12 800AM |
| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Curry |

5261 West Imperial Hwy Los Angeles, CA 90045, Ph (310) 854-6300, Fax (310) 854-0199

211345

#331211345

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

| Turn Around Time - (Circle) *Please select based on laboratory being used | 3hr 6hr 24hr 48hr 72hr (circled) Standard |
|---|---|

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4625 Admiralty Way | Freddy Torres | 27 | 8-1-2012 | 2 | Of | 3 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-2C | Drywall 4625 A North %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 3A | 12x12 Acoustic Ceiling Tile 4637 Adm. Main Room %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3B | 4625 Adm. Main Room %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3C | 4629 Adm. Main Room %RH: Temp: | | | | Analysis Type: Serial No.: |
| 4A | Beige / Blue 12x12 Vinyl Floor Tile 4627 Adm. Bathroom %RH: Temp: | | | | Analysis Type: Serial No.: |
| 4B | %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5A | Beige 12x12 Vinyl Floor Tile 4625 Adm. Beneath Carpet %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5B | 4625 Adm. %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6A | Carpet Glue 4625 Adm. West %RH: Temp: | | | | Analysis Type: Serial No.: |

| *Relinquished By (Print & Sign)(Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
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| *Relinquished By (Print & Sign) (Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |



211345

#331211345

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

| Turn Around Time - (Circle) *Please select based on laboratory being used | 3hr | 6hr | 24hr | 48hr | 72hr | Standard |
|---|---|---|---|---|---|---|

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4625 Admiraltyway | Freddy Torres | 27 | 8-1-2012 | 3 | Of | 3 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8.1.12 6B | Carpet Glue 4625 Adm. East %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 7A | Roof Mastic Roof North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7B | Center %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7C | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 8A | Gravel Roof North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 8B | West %RH: Temp: | | | | Analysis Type: Serial No.: |
| 8C | East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 9A | Grey Rolled on Roofing Storage Roof %RH: Temp: East | | | | Analysis Type: Serial No.: |
| 9B | %RH: Temp: West | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
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| | |
| **Relinquished By (Print & Sign) (Date & Time)** | **Received By (Print & Sign) (Date & Time)** |
| | |

| Special Instructions: | Stop Positive: Yes No | E-mail to Additional Party: |
|---|---|---|
| | | |



11345

#331211316

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4695 Admiralty Way | Freddy Torres | 13 | 8-1-2012 | 1 | Of | 2 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-1A | Wall Board Main Floor North %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 1B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1C | East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2A | 12x12 Acoustic Ceiling Tile %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2B | %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2C | Storage Room %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3A | Beige Vinyl Cove Base Main Floor East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3B | Restroom South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 4A | Roof Mastic Roof North %RH: Temp: | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Freddy Torres 8-2-12 | DB 8/6/12 8:00AM |
| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Curry |

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331211316

# ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

#331211316

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 4695 Admiralty Way | Freddy Torres | 13 | 8-1-2012 | 2 | Of | 2 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-4B | Roof Mastic Roof South %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 5A | Brown Asphault Roof Shingles Roof East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5C | West %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
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| | |
| **Relinquished By (Print & Sign) (Date & Time)** | **Received By (Print & Sign) (Date & Time)** |
| | |

| Special Instructions: | Stop Positive: Yes No | E-mail to Additional Party: |
|---|---|---|

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#331211343

33121343

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

| Turn Around Time - (Circle) *Please select based on laboratory being used | 3hr | 6hr | 24hr | 48hr | 72hr |
|---|---|---|---|---|---|
| | Standard | | | | |

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13441 Mindanao Way | Freddy Torres | 17 | 8-1-2012 | 1 | Of | 2 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112 1A | Joint Compound Seamark Office 1 North %RH: Temp: | | | | Analysis Type: PLM BULK Serial No.: |
| 1B | Seamark Storage Closet East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 1C | Janitor's Storage North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2A | Drywall Seamark Storage Closet East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2B | Seamark Office 2 West %RH: Temp: | | | | Analysis Type: Serial No.: |
| 2C | Janitor's Storage North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3A | Blue 12x12 Vinyl Floor Tile Seamark Storage Closet East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 4A | Beige 12x12 Vinyl Floor Tile Janitor's Storage Closet North %RH: Temp: | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| 8-2-12 Freddy Torres | DB 8/6/12 800AM |
| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Curry |

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331211343

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

#331211343

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13441 Mindanao Way | Freddy Torres | 17 | 8-1-2012 | 2 | Of | 2 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume / Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-4B | Beige 12x12 Vinyl Floor Tile Janitor's Storage Closet South %RH: Temp: | | | | Analysis Type: PLM BULK Serial No.: |
| 5A | Blue Vinyl Cove Base Seamark Storage Closet South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6A | STUCCO Ext. West %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6B | Ext. South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6C | Ext. East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7A | Grey ROLLED ON ROOFING Roof North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7C | East %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |

| *Relinquished By (Print & Sign)(Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
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| | |
| *Relinquished By (Print & Sign) (Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

#331211342

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207 - 784 | 13445 Mindanao Way | Freddy Torres | 21 | 8-1-2012 | 1 | Of | 3 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume / Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112 1A | Joint Compound 2nd Floor Bar West<br>%RH: Temp: | | | | Analysis Type: PLM Bulk<br>Serial No.: |
| 1B | 2nd Fl. Storage Room North<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1C | Kitchen East<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1D | Kitchen West<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1E | 1st Floor Laundry West<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 2A | Drywall 1st Floor HVAC Room West<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 2B | Laundry East<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 2C | 2nd Floor Kitchen West<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 3A | Corr. Heating Duct Insulation 1st Floor HVAC Room<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |

| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Freddy Torres 8-2-12 | DB 8/6/12 800AM |
| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Levy |

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#33121134 2

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13445 Mindanao Way | Freddy Torres | 21 | 8-1-2012 | 2 | Of | 3 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112-3B | Corr. Heating Duct Insulation 1st Floor HVAC Room %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 4A | Heating Duct Insulation Tape %RH: Temp: | | | | Analysis Type: Serial No.: |
| 4B | %RH: Temp: | | | | Analysis Type: Serial No.: |
| 5A | Beige Pebble 12x12 Vinyl Floor Tile Men's Restroom North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6A | Beige Speck 12x12 Vinyl Floor Tile 1st Floor Laundry Room North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7A | Beige Square Sheet Vinyl Flooring 2nd Floor Kitchen North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 8A | Grey Vinyl Cove Base 2nd Floor Kitchen North %RH: Temp: | | | | Analysis Type: Serial No.: |

| *Relinquished By (Print & Sign)(Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
|---|---|
| | |
| *Relinquished By (Print & Sign) (Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

#331211342

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

| Turn Around Time - (Circle) *Please select based on laboratory being used | 3hr | 6hr | 24hr | 48hr | 72hr |
|---|---|---|---|---|---|
| | Standard | | | | |

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13445 Mindanao Way | Freddy Torres | 21 | 8-1-2012 | 3 | Of | 3 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112 8B | Grey Vinyl Cove Base 2nd Floor Kitchen South %RH: Temp: | | | | Analysis Type: PLM Bulk Serial No.: |
| 9A | Black Vinyl Cove Base 2nd Floor Bar East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 10A | Beige Vinyl Cove Base 1st Floor Laundry West %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |

| *Relinquished By (Print & Sign)(Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
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| *Relinquished By (Print & Sign) (Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
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| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

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321213377

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | Pier. 44 | Ben Curry | 6 | 8/8/12 | 1 | Of | 1 |

| Sample No.: | Sample Location & Comments | | | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume / Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|---|---|
| 101 | Roof Core Build. 13445 | %RH: | Temp: | | | | Analysis Type: PLM<br>Serial No.: |
| 102 | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| 103 | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| 104 | Roof Mastic Build. 13445 | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| 105 | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| 106 | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |
| | | %RH: | Temp: | | | | Analysis Type:<br>Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Ben Curry 8/8/12 11:30 Am | [signature] 8/8/12 2:15pm |
| *Relinquished By (Print & Sign) (Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

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#331211347

331211347

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207- 784 | 13444 Bali Way | Freddy Torres | 32 | 8-1-2012 | 1 | Of | 4 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112 1A | Joint Compound 1st Floor Men's Restroom East<br>%RH: Temp: | | | | Analysis Type: PLM BULK<br>Serial No.: |
| 1B | 1st Floor Storage South<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1C | 1st Floor Entry West<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1D | 2nd Floor North<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1E | 2nd Floor Kitchen East<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1F | 2nd Floor South<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 1G | 1st Floor South Hallway<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 2A | Drywall 1st Floor Storage<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |
| 2B | 1st Floor Men's Restroom<br>%RH: Temp: | | | | Analysis Type:<br>Serial No.: |

| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
|---|---|
| Freddy Torres 8-2-12 | DB 8/6/12 8:00AM |
| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | Ben Curry |

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#331211347

331211347

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13444 Bali Way | Freddy Torres | 32 | 8-1-2012 | 2 | Of | 4 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8112 2C | Drywall 2nd Floor North %RH: Temp: | | | | Analysis Type: PLM BULK Serial No.: |
| 3A | PLASTER 2nd Floor Kitchen %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3B | %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3C | HVAC CLOSET %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3D | %RH: Temp: | | | | Analysis Type: Serial No.: |
| 3E | %RH: Temp: | | | | Analysis Type: Serial No.: |
| 4A | Beige Sheet Vinyl Flooring 1st Floor Men's Restroom %RH: Temp: East | | | | Analysis Type: Serial No.: |
| 4B | 1st Floor Storage %RH: Temp: West | | | | Analysis Type: Serial No.: |
| 5A | BROWN VINYL COVE BASE 1st Floor South Hallway %RH: Temp: East | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
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| Relinquished By (Print & Sign) (Date & Time) | Received By (Print & Sign) (Date & Time) |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

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#331211347

1211347

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

Turn Around Time - (Circle) *Please select based on laboratory being used

3hr 6hr 24hr 48hr 72hr

Standard

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13444 Bali Way | Freddy Torres | 32 | 8-1-2012 | 3 | Of | 4 |

| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume / Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 811-2 5B | Brown Vinyl Cove Base 2nd Floor North %RH: Temp: | | | | Analysis Type: PLM BULK Serial No.: |
| 6A | STUCCO Ext. South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6B | East %RH: Temp: | | | | Analysis Type: Serial No.: |
| 6C | West %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7A | ROOF MASTIC Main Bldg. Roof North %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7B | South %RH: Temp: | | | | Analysis Type: Serial No.: |
| 7C | Restroom Bldg Roof %RH: Temp: East | | | | Analysis Type: Serial No.: |
| 7D | %RH: Temp: West | | | | Analysis Type: Serial No.: |
| 8A | BROWN ASHPAULT ROOF SHINGLES Main Bldg. Roof %RH: Temp: South | | | | Analysis Type: Serial No.: |

| Relinquished By (Print & Sign)(Date & Time) | Received By (Print & Sign) (Date & Time) |
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| **Relinquished By (Print & Sign) (Date & Time)** | **Received By (Print & Sign) (Date & Time)** |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

1347

#331211347

ANDERSEN ENVIRONMENTAL

# Laboratory Chain of Custody

**Turn Around Time - (Circle)** *Please select based on laboratory being used

**3hr** **6hr** **24hr** **48hr** **72hr**

**Standard**

| Andersen Environmental Project No.: | Project Name: | Sampling By: | Number of Samples: | Date(s) Collected: | Page No.: | | Total Pages |
|---|---|---|---|---|---|---|---|
| 1207-784 | 13444 Bali Way | Freddy Torres | 32 | 8-1-2012 | 4 | Of | 4 |

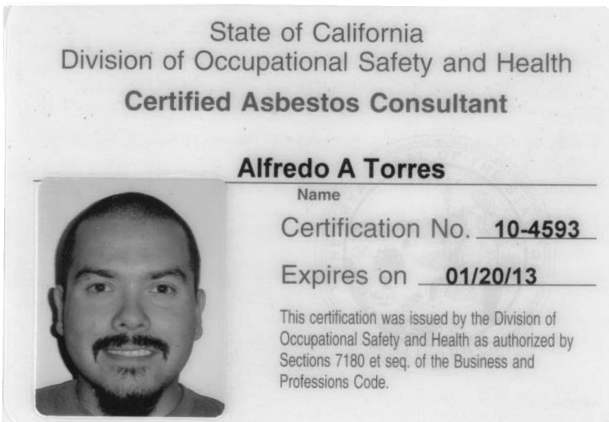
| Sample No.: | Sample Location & Comments | Start Flow Rate / End Flow Rate | Start Time / Stop Time | Total Volume Area/SQFT | Type of Analysis / Sample Serial Number |
|---|---|---|---|---|---|
| 8H2 8B | Brown Asphault Roof Shingles Main Bldg. Roof %RH: Temp: East | | | | Analysis Type: PLM BULK Serial No.: |
| 8C | %RH: Temp: Center | | | | Analysis Type: Serial No.: |
| 9A | BLACK Asphault Roof Shingles Restroom Bldg. Roof %RH: Temp: East | | | | Analysis Type: Serial No.: |
| 9B | %RH: Temp: Center | | | | Analysis Type: Serial No.: |
| 9C | %RH: Temp: West | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |
| | %RH: Temp: | | | | Analysis Type: Serial No.: |

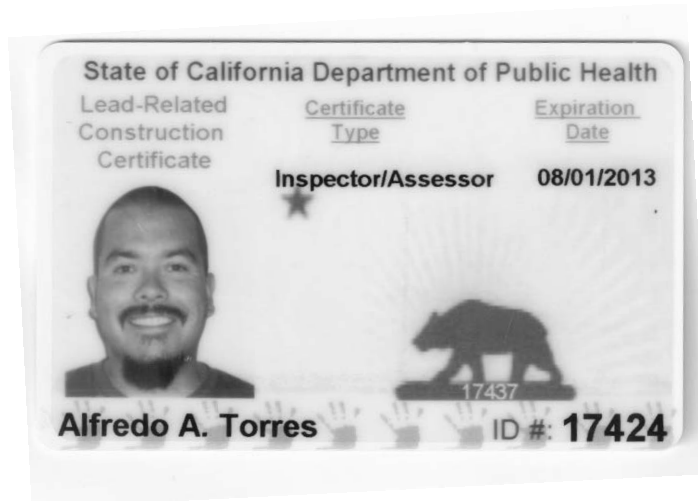
| *Relinquished By (Print & Sign)(Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
|---|---|
| | |
| *Relinquished By (Print & Sign) (Date & Time)* | *Received By (Print & Sign) (Date & Time)* |
| | |

| Special Instructions: | Stop Positive: | E-mail to Additional Party: |
|---|---|---|
| | Yes No | |

5261 West Imperial Hwy Los Angeles, CA 90045, Ph (310) 854-6300, Fax (310) 854-0199

Alfredo Torres
California DOSH **Certified Asbestos Consultant** (C**AC**) #**10-4593**
California DPH **Certified Lead Inspector Assessor** (CLIA) #17424



State of California
Division of Occupational Safety and Health
**Certified Asbestos Consultant**

**Benjamin P Curry**
Name

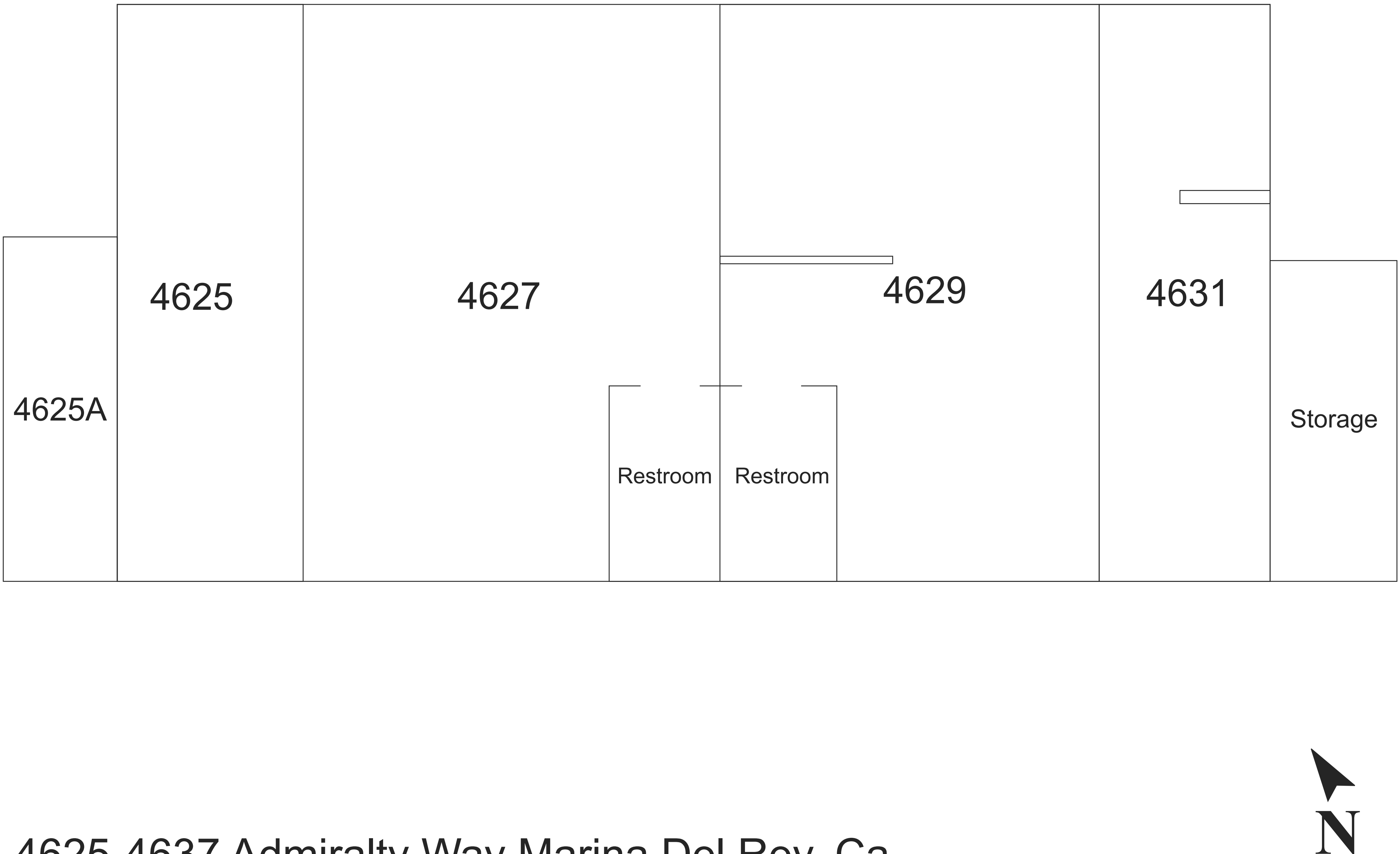
Certification No. **09-4549**

Expires on **07/23/13**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.


3 - 2 story
4 - 1 story

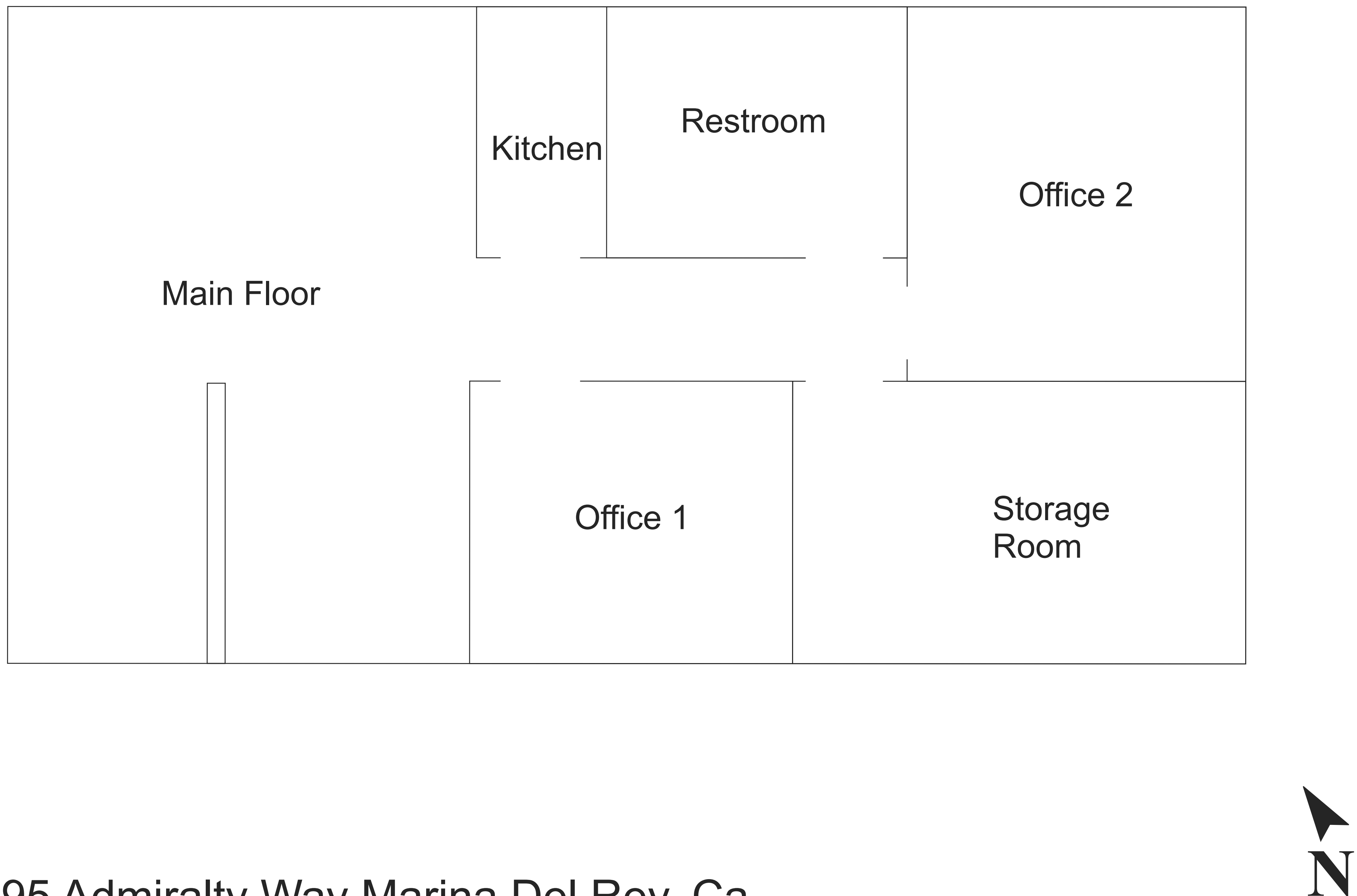
# First Floor



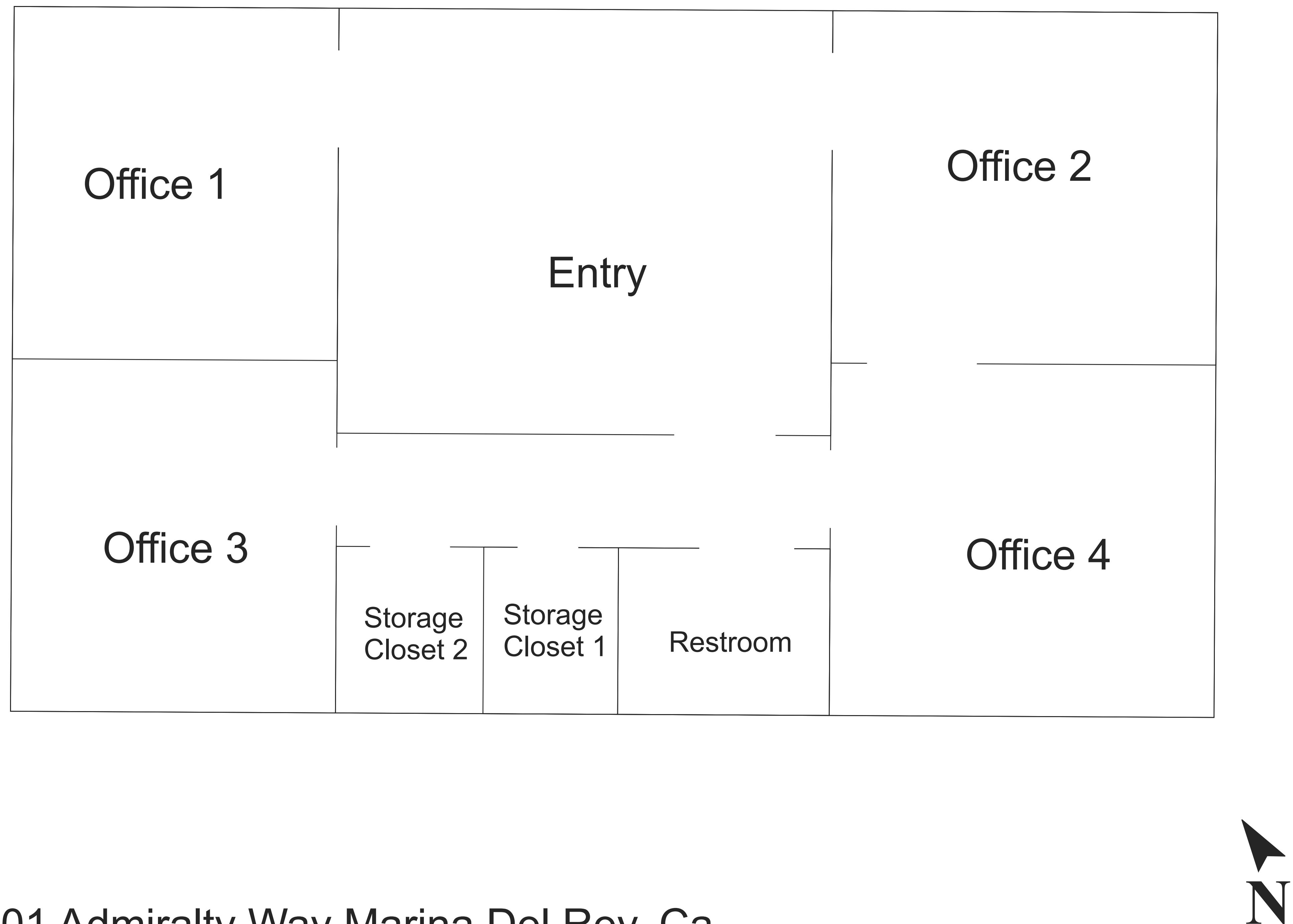

4625-4637 Admiralty Way Marina Del Rey, Ca

## Second Floor

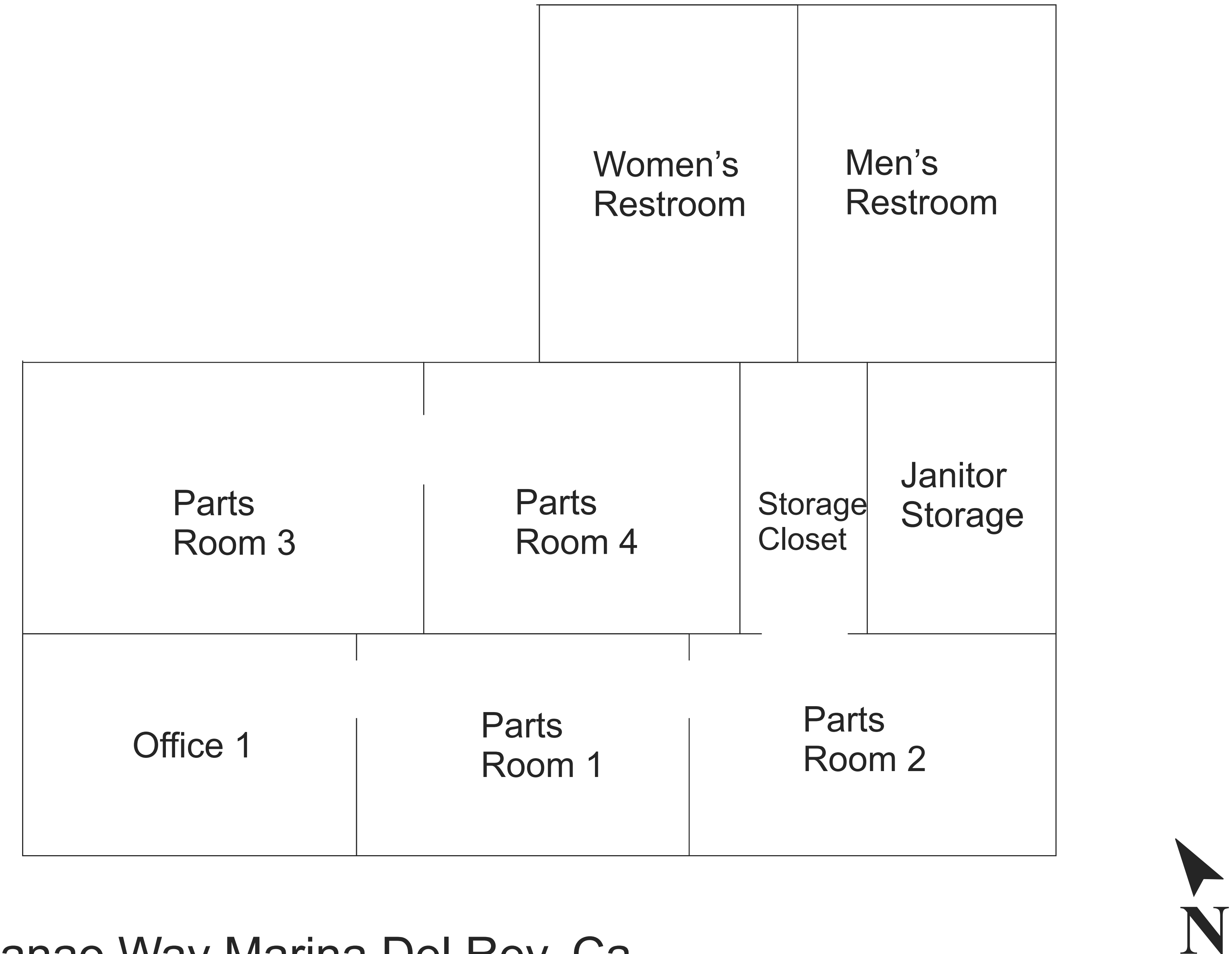

4625-4637 Admiralty Way Marina Del Rey, Ca




4695 Admiralty Way Marina Del Rey, Ca

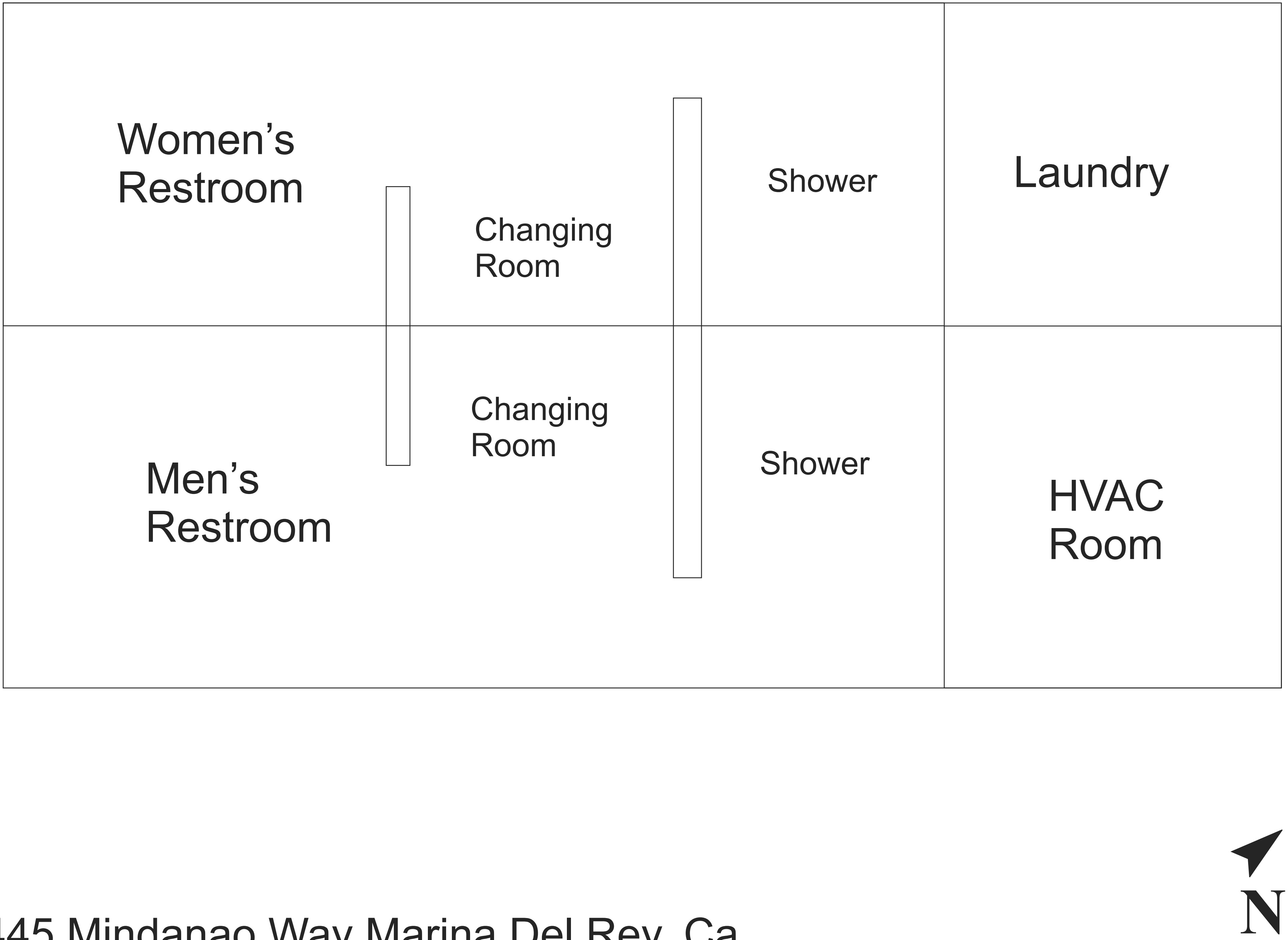



4601 Admiralty Way Marina Del Rey, Ca



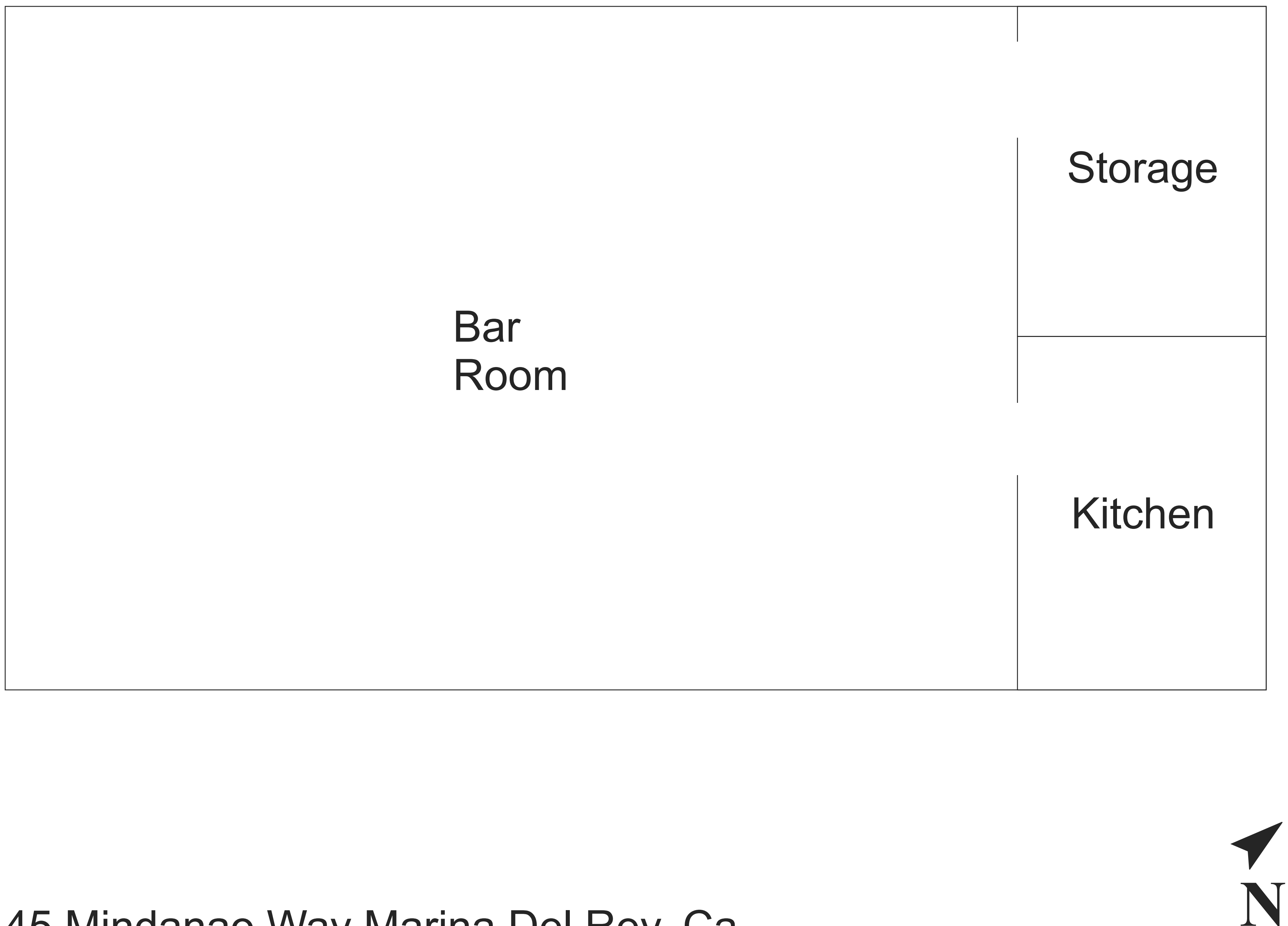

13441 Mindanao Way Marina Del Rey, Ca

# First Floor



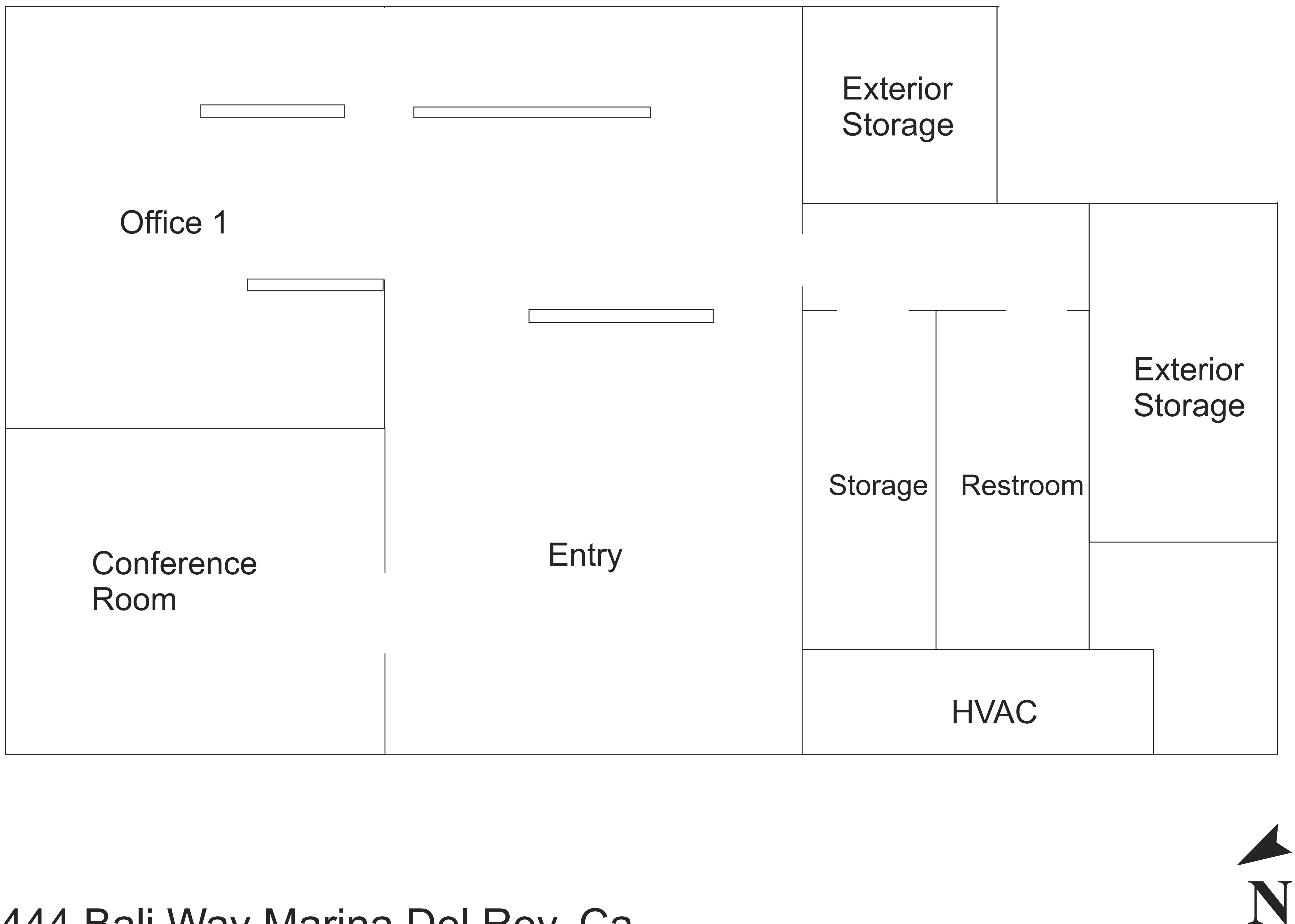

13445 Mindanao Way Marina Del Rey, Ca

Second Floor




13445 Mindanao Way Marina Del Rey, Ca

# First Floor

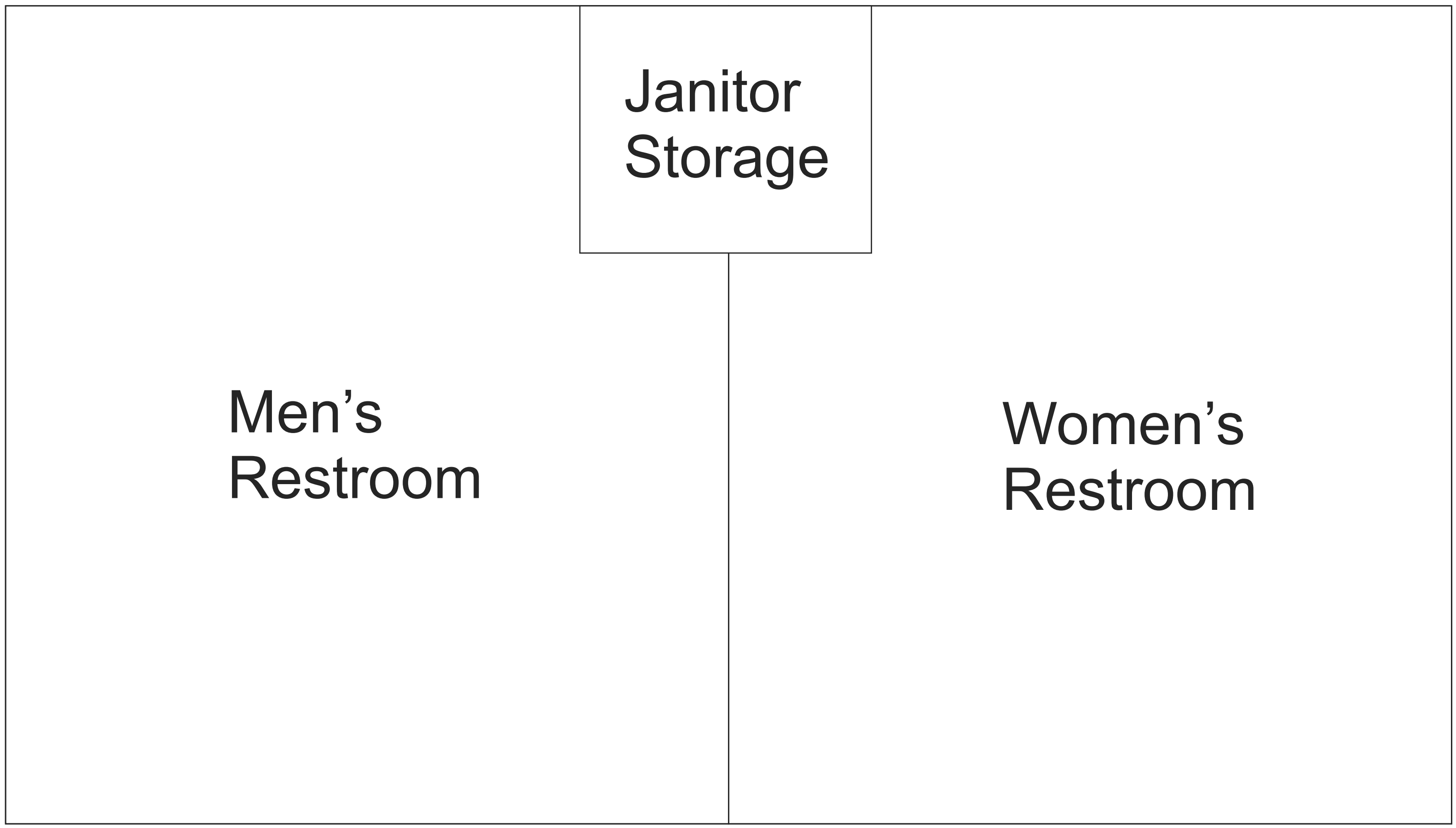



13444 Bali Way Marina Del Rey, Ca

# Second Floor


13444 Bali Way Marina Del Rey, Ca

Marina Restrooms




13444 Bali Way Marina Del Rey, Ca

ANDERSEN ENVIRONMENTAL
5261 W. Imperial Highway, Los Angeles, CA 90045
Toll Free: (888) 705-6300 Tel: (310) 854-6300 Fax: (310) 854-0199

# LIMITED LEAD-BASED PAINT INSPECTION REPORT

PERFORMED AT

PIER 44
4601, 4625-4637 & 4695 Admiralty Way
13441 & 13445 Mindanao Way
13444 & 13446 Bali Way
Marina Del Rey, CA 90292

Project No.: 1207-784

PREPARED FOR

Pacific Marina Ventures, LLC
13737 Fiji Way, C-10
Marina Del Rey, CA 90292

August 24, 2012

# TABLE OF CONTENTS

## 1.0 INTRODUCTION

Mr. Michael Pashaie of Pacific Marina Ventures, LLC (referred to hereunder as the client) retained Andersen Environmental to perform a pre-demolition lead-based paint (LBP) inspection of the seven structures located at 4601, 4625-4637 & 4695 Admiralty Way; 13441 & 13445 Mindanao Way and 13444 & 13446 Bali Way including a restroom building (otherwise known as Pier 44) in Marina del Rey, CA 90292. This document is prepared for the sole use of the client, and any regulatory agencies that are directly involved in this project. No other party should rely on the information contained herein without prior written consent of the client. The scope of services, inspection methodology, and results are presented below.

## 2.0 SCOPE OF WORK

The purpose of this inspection is to identify and assess the Lead-Based Paint (LBP) present on painted components at the subject property.

On August 1 & 2, 2012, Andersen Environmental performed an inspection for lead-based paint at the subject property in Marina Del Rey, California. To comply with EPA and HUD guidelines, painted and varnished surfaces in every accessible "room equivalent" were sampled for the presence of LBP. The intent was to ascertain the presence of lead-based paint above the federal action level. If LBP was found, the inspection would identify individual architectural components and their respective concentrations of lead in such a manner that this report would be used to characterize the presence of LBP at this property.

## 3.0 PROPERTY DESCRIPTION

The subject property consists of four single story buildings and three two-story buildings. The buildings are of wood-framed construction with pitched and sit on concrete slab foundations. The exterior finishes include either wood siding or concrete masonry unit exterior walls. At the time of this inspection, most of the painted surfaces were in fair to good condition.

## 4.0 INSPECTOR'S QUALIFICATIONS

Freddy Torres of Andersen Environmental performed the inspection at the site using a Niton XRF spectrum analyzer instrument.

At the time of this report, the California Department of Health Services, Childhood Lead Poisoning Branch, has implemented a State Certification Model Accreditation Plan adopted from the EPA. Freddy Torres has received certification. Personnel certificate(s) have been provided in ***Appendix C.***

## 5.0 TESTING PROTOCOL

**XRF Testing:** Testing of the painted surfaces was patterned after the inspection protocol in Chapter 7 of the HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing[i]. In every "room equivalent" within the tested property, one representative surface of each "testing combination" was tested. Multiple readings were collected to resolve inconsistencies in the test results.

**Regulatory Compliance:** Several public (government) agencies have a published "regulatory action level" to classify LBP. To further complicate matters, some of the established "levels" are quantified in different units of measurement. Listed below are the current regulatory agencies that have defined LBP, along with the respective action level:

| Agency | Ordinance # | Action level (mg / cm$^2$) | Action level (ppm[ii]) |
|---|---|---|---|
| **HUD / EPA** | 24 CFR 35.86 & 40 CFR 745.103 | 1.0 mg / cm$^2$ | 5,000 ppm |
| **L.A. County** | Title 11, 11.28.010 | 0.7 mg / cm$^2$ | 600 ppm[ii] |
| **OSHA / CAL OSHA** | 29 CFR 1926.62 & Title 8, 1532.1 | *Not Specified* | 600 ppm[iii] |

HUD / EPA have recently issued the following guidance regarding units of measurement for paint samples:

"Report lead paint amounts in mg/cm² because this unit of measurement does not depend on the number of layers of non-lead-based paint and can usually be obtained without damaging the painted surface. All measurements of lead in paint should be in mg/cm², unless the surface area cannot be measured or if all paint cannot be removed from the measured surface area. In such cases, concentrations may be reported in weight percent (%) or parts per million by weight (ppm)."[iv]

Furthermore, EPA has previously issued guidance on lead content classification as follows:

"… The rule, at 24 CFR 35.86 and 40 CFR 745.103 states that a lead-based paint free finding must demonstrate that the building is free of 'paint or other surface coatings that contain lead in excess of 1.0 milligrams per square centimeter *(1.0 mg / cm$^2$)* or 0.5 percent by weight *(5000 ppm)*.' The State standards are not applicable, whether more or less stringent, since a State cannot amend Federal requirements."[v]

In recognition of the various action levels the testing results are classified as follows for this report:

- Painted surfaces with readings at or above 0.7 mg / cm$^2$ are considered - Positive
- Painted surfaces with readings below 0.7 mg / cm$^2$ are considered - Negative

***The individual readings have been provided on all field data sheets. Any future change in action levels by one of the regulating agencies may affect the classification of results.***

## 6.0 METHOD OF TESTING

**Paint Testing:** The method employed was X-ray fluorescence (XRF) using a Niton XLp 303A by Thermo Scientific, this unit uses a radioactive source of Cadmium 109. It was calibrated to NIST standard lead concentration samples prior to and after its use. Uncoated surfaces and other bare materials were not tested. The instrument was operated in "Quick Mode," where the duration for each test result is determined by a combination of:

- The actual reading relative to the designated action level;
- Age of the radioactive source;
- The substrate on which the test was taken.

The instrument's calibration was verified according to the manufacturer's specifications in compliance with the Performance Characteristic Sheet (PCS) developed for this instrument.

The readings from this instrument produce a 95% confidence level that the "lead" reading accurately reflects the actual level of lead in the tested surfaces, relative to the federal action level.

## 7.0 SUMMARY OF RESULTS

**Paint Sampling:** Throughout the subject property, several of the painted components indicated the presence of lead-based paint (LBP) at or above the action level. The following summary lists the specific components that tested above the action level and their respective locations:

**Interior**
- 4629 Admiralty Way, Restroom, Ceramic Wall Tile
- 4627 Admiralty Way, Restroom, Ceramic Wall Tile
- 13444 Bali Way, Restrooms & Storage, Ceramic Wall Tile
- Bali Way Restroom Building, Men's Room, Ceramic Floor & Wall Tile
- Bali Way Restroom Building, Women's Room, Ceramic Wall Tile
- 13445 Mindanao Way, Restrooms, Ceramic Wall & Shower Tile
- 13441 Mindanao Way, Restrooms, Ceramic Wall Tile

**Exterior**
- 13445 Mindanao Way, Concrete Ballard

The field data and results for paint sampling may be found in ***Appendices A.***

## 8.0 RECOMMENDATIONS

Numerous components and painted surfaces throughout the interior and exterior of the subject property were determined to contain lead concentrations above the regulated amount. All LBP and components were found in good condition.

LBP components in good condition may remain in place subsequent to renovation/demolition or they may be removed intact by lead trained personnel in accordance with all applicable federal, state and local regulations.

During the removal of the Lead Based Paint, Andersen Environmental should be on-site to perform area monitoring for lead dust in areas outside of the containments to ensure that adjacent areas are not being impacted by the removal of the lead-based paint. Additionally, Andersen Environmental recommends collecting post abatement clearance wipe sampling prior to re-occupancy of the areas by un-licensed personnel.

Should the contractor choose not to remove the lead-based paint materials and demolish portions of the structure with the lead-based paint components in place, it is recommended that samples, representative of the entire mass of the prospective waste stream, be collected by Andersen Environmental as a third party verification. These samples should then be analyzed according to the CAL EPA protocols for waste characterization as follows:

To characterize all waste streams, the following should be performed:

- Collect a representative sample of the waste material.
- For a pile of waste take one sample of a proportionate combination of Component in the pile. If a large quantity of waste is generated no less than four samples may be required.

Analysis for the waste characterization samples shall be performed as follows:

- Waste generated by chemical stripping shall, in addition to the requirements for determining the solid and soluble lead concentrations, shall be tested for corrosiveness and other contaminants, as applicable, resulting from the chemical stripping process.

- Analyze samples for Total Threshold Limit Concentration (TTLC)
    - If results are less than 50mg/kg, the waste is not hazardous and shall be disposed as general construction waste
    - If sample results are between 50 and 1,000 mg/kg, the waste shall be tested for Soluble Threshold Limit Concentration (STLC)
    - If the sample results are above 1,000 mg/kg the waste is considered California Regulated hazardous Waste, and no further testing is needed

Where waste is required to be tested for STLC, the following shall apply:

- If the STLC results are less than 5 mg/L, and had a TTLC of less than 350 mg/kg, the material shall be disposed at a Class II waste landfill. Evidence of such results of the STLC testing will be required by the landfill before waste is accepted. No further testing is required.
- If the STLC results are 5 mg/L or greater, or had a TTLC between 350 mg/kg and 1,000 mg/kg, the waste is a California regulated waste and the material shall be tested using the federally mandated Toxicity Characterization Leaching Procedure (TCLP).

Where waste is required to be tested by TCLP the following shall apply:

- If the TCLP is less than 5 mg/L, the waste is California regulated hazardous solid waste (non-RCRA). This material may be disposed as Non-RCRA Waste. However, it must be wrapped in plastic, profiled and a waste manifest is required.
- If the TCLP is equal to or greater than 5 mg/L, the waste is a federally regulated hazardous waste solid (RCRA). The waste shall then require treatment before being disposed in a Class I hazardous waste landfill.

## 9.0 RENOVATION, REPAIR AND PAINTING (RRP) RULE

Anyone performing renovation, repair and painting projects that disturb painted surfaces in residences, child care facilities, and schools built before 1978 must be EPA RRP certified and follow specific lead safe work practices to prevent lead contamination. The rule applies where more than 6 square feet per room or 20 square feet outside will be “disturbed” by workers(s) being compensated.

## 10.0 TITLE X REQUIREMENTS

A copy (or summary) of this report must be provided to new lessees (tenants) and purchasers of this property under Federal law (24 CFR part 35 and 40 CFR part 745) before they become obligated under a lease or sales contract. The complete report must also be provided to new purchasers and it must be made available to new tenants. Landlords (lessors) and sellers are also required to distribute an educational pamphlet approved by the U.S. Environmental Protection Agency and include standard warning language in their leases or sales contracts to ensure that parents have the information they need to protect their children from lead-based paint hazards. This report should be maintained and updated as a permanent maintenance record for this property.

## 11.0 INSPECTION LIMITATIONS

This inspection was planned, developed, and implemented based on Andersen Environmental's previous experience in performing lead-based paint inspections/risk assessments. This inspection was patterned after Chapter 7 of the *HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (1997 Revision)*. Andersen Environmental utilized state-of-the-art-practices and techniques in accordance with regulatory standards while performing this inspection/risk assessment. Andersen Environmental's evaluation of the relative risk of exposure to lead identified during this inspection/risk assessment is based on conditions observed at the time of the inspection. Andersen Environmental cannot be responsible for changing conditions that may alter the relative exposure risk or for future changes in accepted methodology.

Enclosed are the diagram(s), actual test results, and all relevant certifications and licenses.

Sincerely,

Ben Curry

Benjamin Curry
DHS Certified Lead Inspector / Risk Assessor / Supervisor No.: 20747

[i] 1997 Revision
[ii] Applies to sale and application of LBP.
[iii] Applies to construction related activities
[iv] Chapter 7 of the HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (1997 Revision).
[v] Office of Pollution Prevention and Toxics, (August 20, 1996)

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **8/1/2012** | **Shutter. Cal** | **Res. 391.07** | | | | | | | |
| **2** | **8/1/2012** | **Calibration** | | | | | | | **Positive** | **1.2** |
| **3** | **8/1/2012** | **Calibration** | | | | | | | **Positive** | **1** |
| **4** | **8/1/2012** | **Calibration** | | | | | | | **Positive** | **1.1** |
| 5 | 8/1/2012 | 4629 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.09 |
| 6 | 8/1/2012 | 4629 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.05 |
| 7 | 8/1/2012 | 4629 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.05 |
| 8 | 8/1/2012 | 4629 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.02 |
| 9 | 8/1/2012 | 4629 Admiralty Way | Main | Ceiling | Beam | Wood | | Intact | Negative | 0.17 |
| 10 | 8/1/2012 | 4629 Admiralty Way | Office 1 | Wall | | Drywall | A | Intact | Negative | 0.04 |
| 11 | 8/1/2012 | 4629 Admiralty Way | Office 1 | Wall | | Drywall | B | Intact | Negative | 0.06 |
| 12 | 8/1/2012 | 4629 Admiralty Way | Office 1 | Wall | | Drywall | C | Intact | Negative | 0.06 |
| 13 | 8/1/2012 | 4629 Admiralty Way | Office 1 | Wall | | Wood | D | Intact | Negative | 0.01 |
| 14 | 8/1/2012 | 4629 Admiralty Way | Office 1 | Door | Frame | Wood | A | Intact | Negative | 0.4 |
| 15 | 8/1/2012 | 4629 Admiralty Way | Office 1 | Door | Jamb | Wood | A | Intact | Negative | 0.5 |
| 16 | 8/1/2012 | 4629 Admiralty Way | Restroom | Wall | | Drywall | A | Intact | Negative | 0.3 |
| 17 | 8/1/2012 | 4629 Admiralty Way | Restroom | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 18 | 8/1/2012 | 4629 Admiralty Way | Restroom | Wall | | Drywall | C | Intact | Negative | 0.13 |
| 19 | 8/1/2012 | 4629 Admiralty Way | Restroom | Wall | | Drywall | D | Intact | Negative | 0.06 |
| 20 | 8/1/2012 | 4629 Admiralty Way | Restroom | Ceiling | Beam | Wood | | Intact | Negative | 0.13 |
| 21 | 8/1/2012 | 4629 Admiralty Way | Restroom | Door | Frame | Wood | A | Intact | Negative | 0.3 |
| 22 | 8/1/2012 | 4629 Admiralty Way | Restroom | Door | Jamb | Wood | A | Intact | Negative | 0.4 |
| 23 | 8/1/2012 | 4629 Admiralty Way | Restroom | Floor | Tile | Ceramic | | Intact | Negative | 0.04 |
| **24** | **8/1/2012** | **4629 Admiralty Way** | **Restroom** | **Wall** | **Tile** | **Ceramic** | **C** | **Intact** | **Positive** | **10.4** |
| 25 | 8/1/2012 | 4625 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.03 |
| 26 | 8/1/2012 | 4625 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.6 |
| 27 | 8/1/2012 | 4625 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.06 |
| 28 | 8/1/2012 | 4625 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.04 |
| 29 | 8/1/2012 | 4625 Admiralty Way | Main | Ceiling | Beam | Wood | | Intact | Negative | 0.19 |
| 30 | 8/1/2012 | 4625A Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.04 |
| 31 | 8/1/2012 | 4625A Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.13 |
| 32 | 8/1/2012 | 4625A Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.06 |
| 33 | 8/1/2012 | 4625A Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.01 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 8/1/2012 | 4625A Admiralty Way | Main | Ceiling | | Drywall | | Intact | Negative | 0.03 |
| 35 | 8/1/2012 | 4625A Admiralty Way | Main | Crown Molding | | Wood | C | Intact | Negative | 0.3 |
| 36 | 8/1/2012 | 4625A Admiralty Way | Main | Baseboard | | Wood | A | Intact | Negative | 0.3 |
| 37 | 8/1/2012 | 4625A Admiralty Way | Main | Door | Frame | Wood | D | Intact | Negative | 0.4 |
| 38 | 8/1/2012 | 4625A Admiralty Way | Main | Door | Jamb | Wood | D | Intact | Negative | 0.28 |
| 39 | 8/1/2012 | 4637 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.06 |
| 40 | 8/1/2012 | 4637 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.13 |
| 41 | 8/1/2012 | 4637 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 42 | 8/1/2012 | 4637 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.12 |
| 43 | 8/1/2012 | 4637 Admiralty Way | Main | Door | Frame | Wood | B | Intact | Negative | 0.4 |
| 44 | 8/1/2012 | 4637 Admiralty Way | Main | Door | Jamb | Wood | B | Intact | Negative | 0.3 |
| 45 | 8/1/2012 | 4635 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 46 | 8/1/2012 | 4635 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 47 | 8/1/2012 | 4635 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.09 |
| 48 | 8/1/2012 | 4635 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.1 |
| 49 | 8/1/2012 | 4635 Admiralty Way | Main | Ceiling | Beam | Wood | | Intact | Negative | 0.22 |
| 50 | 8/1/2012 | 4635 Admiralty Way | Main | Door | Frame | Wood | A | Intact | Negative | 0.4 |
| 51 | 8/1/2012 | 4635 Admiralty Way | Main | Door | Jamb | Wood | A | Intact | Negative | 0.4 |
| 52 | 8/1/2012 | 4695 Admiralty Way | Main | Wall | | Wood | A | Intact | Negative | 0.1 |
| 53 | 8/1/2012 | 4695 Admiralty Way | Main | Wall | | Wood | B | Intact | Negative | 0.03 |
| 54 | 8/1/2012 | 4695 Admiralty Way | Main | Wall | | Wood | C | Intact | Negative | 0.01 |
| 55 | 8/1/2012 | 4695 Admiralty Way | Main | Wall | | Wood | D | Intact | Negative | 0.01 |
| 56 | 8/1/2012 | 4695 Admiralty Way | Kitchen | Wall | | Wood | A | Intact | Negative | 0.02 |
| 57 | 8/1/2012 | 4695 Admiralty Way | Kitchen | Wall | | Wood | B | Intact | Negative | 0.01 |
| 58 | 8/1/2012 | 4695 Admiralty Way | Kitchen | Wall | | Wood | C | Intact | Negative | 0.08 |
| 59 | 8/1/2012 | 4695 Admiralty Way | Kitchen | Wall | | Wood | D | Intact | Negative | 0.06 |
| 60 | 8/1/2012 | 4695 Admiralty Way | Kitchen | Door | Frame | Wood | C | Intact | Negative | 0.4 |
| 61 | 8/1/2012 | 4695 Admiralty Way | Kitchen | Door | Jamb | Wood | C | Intact | Negative | 0.13 |
| 62 | 8/1/2012 | 4695 Admiralty Way | Office 1 | Wall | | Wood | A | Intact | Negative | 0.01 |
| 63 | 8/1/2012 | 4695 Admiralty Way | Office 1 | Wall | | Wood | B | Intact | Negative | 0.15 |
| 64 | 8/1/2012 | 4695 Admiralty Way | Office 1 | Wall | | Wood | C | Intact | Negative | 0.08 |
| 65 | 8/1/2012 | 4695 Admiralty Way | Office 1 | Wall | | Wood | D | Intact | Negative | 0.26 |
| 66 | 8/1/2012 | 4695 Admiralty Way | Office 1 | Door | Frame | Wood | A | Intact | Negative | 0.16 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 67 | 8/1/2012 | 4695 Admiralty Way | Office 1 | Door | Jamb | Wood | A | Intact | Negative | 0.15 |
| 68 | 8/1/2012 | 4695 Admiralty Way | Restroom | Wall | | Wood | A | Intact | Negative | 0.01 |
| 69 | 8/1/2012 | 4695 Admiralty Way | Restroom | Wall | | Wood | B | Intact | Negative | 0.02 |
| 70 | 8/1/2012 | 4695 Admiralty Way | Restroom | Wall | | Wood | C | Intact | Negative | 0.02 |
| 71 | 8/1/2012 | 4695 Admiralty Way | Restroom | Wall | | Wood | D | Intact | Negative | 0.01 |
| 72 | 8/1/2012 | 4695 Admiralty Way | Restroom | Door | Frame | Wood | C | Intact | Negative | 0.26 |
| 73 | 8/1/2012 | 4695 Admiralty Way | Restroom | Door | Jamb | Wood | C | Intact | Negative | 0.4 |
| 74 | 8/1/2012 | 4695 Admiralty Way | Restroom | Floor | Tile | Ceramic | | Intact | Negative | 0.03 |
| 75 | 8/1/2012 | 4695 Admiralty Way | Office 2 | Wall | | Drywall | A | Intact | Negative | 0.06 |
| 76 | 8/1/2012 | 4695 Admiralty Way | Office 2 | Wall | | Drywall | B | Intact | Negative | 0.02 |
| 77 | 8/1/2012 | 4695 Admiralty Way | Office 2 | Wall | | Drywall | C | Intact | Negative | 0.02 |
| 78 | 8/1/2012 | 4695 Admiralty Way | Office 2 | Wall | | Drywall | D | Intact | Negative | 0.03 |
| 79 | 8/1/2012 | 4695 Admiralty Way | Office 2 | Door | Frame | Wood | D | Intact | Negative | 0.19 |
| 80 | 8/1/2012 | 4695 Admiralty Way | Office 2 | Door | Jamb | Wood | D | Intact | Negative | 0.19 |
| 81 | 8/1/2012 | 4695 Admiralty Way | Storage | Wall | | Drywall | A | Intact | Negative | 0.06 |
| 82 | 8/1/2012 | 4695 Admiralty Way | Storage | Wall | | Drywall | B | Intact | Negative | 0.18 |
| 83 | 8/1/2012 | 4695 Admiralty Way | Storage | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 84 | 8/1/2012 | 4695 Admiralty Way | Storage | Wall | | Drywall | D | Intact | Negative | 0.02 |
| 85 | 8/1/2012 | 4695 Admiralty Way | Storage | Door | Frame | Wood | B | Intact | Negative | 0.19 |
| 86 | 8/1/2012 | 4695 Admiralty Way | Storage | Door | Jamb | Wood | B | Intact | Negative | 0.27 |
| 87 | 8/1/2012 | 4695 Admiralty Way | Exterior | Wall | Siding | Metal | A | Intact | Negative | 0.01 |
| 88 | 8/1/2012 | 4695 Admiralty Way | Exterior | Overhang | Facia | Metal | A | Intact | Negative | 0.01 |
| 89 | 8/1/2012 | 4695 Admiralty Way | Exterior | Railing | | Wood | A | Intact | Negative | 0.05 |
| 90 | 8/1/2012 | 4695 Admiralty Way | Exterior | Ramp | | Wood | A | Intact | Negative | 0.01 |
| 91 | 8/1/2012 | 4695 Admiralty Way | Exterior | Stair | Riser | Wood | A | Intact | Negative | 0.03 |
| 92 | 8/1/2012 | 4695 Admiralty Way | Exterior | Stair | Tread | Wood | A | Intact | Negative | 0.01 |
| 93 | 8/1/2012 | 4695 Admiralty Way | Exterior | Lower Wall | | Stucco | A | Intact | Negative | 0.03 |
| 94 | 8/1/2012 | 4695 Admiralty Way | Exterior | Overhang | Facia | Metal | B | Intact | Negative | 0.02 |
| 95 | 8/1/2012 | 4695 Admiralty Way | Exterior | Wall | Siding | Metal | B | Intact | Negative | 0.01 |
| 96 | 8/1/2012 | 4695 Admiralty Way | Exterior | Wall | Siding | Metal | C | Intact | Negative | 0.01 |
| 97 | 8/1/2012 | 4695 Admiralty Way | Exterior | Lower Wall | | Stucco | D | Intact | Negative | 0.01 |
| 98 | 8/1/2012 | 4601 Admiralty Way | Exterior | Wall | Siding | Wood | A | Intact | Negative | 0.08 |
| 99 | 8/1/2012 | 4601 Admiralty Way | Exterior | Overhang | Facia | Wood | A | Intact | Negative | 0.02 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 8/1/2012 | 4601 Admiralty Way | Exterior | Overhang | Beam | Wood | A | Intact | Negative | 0.1 |
| 101 | 8/1/2012 | 4601 Admiralty Way | Exterior | Overhang | Ceiling | Wood | A | Intact | Negative | 0.01 |
| 102 | 8/1/2012 | 4601 Admiralty Way | Exterior | Railing | | Wood | A | Intact | Negative | 0.03 |
| 103 | 8/1/2012 | 4601 Admiralty Way | Exterior | Corner Molding | | Wood | A | Intact | Negative | 0.24 |
| 104 | 8/1/2012 | 4601 Admiralty Way | Exterior | Wall | Siding | Wood | B | Intact | Negative | 0.04 |
| 105 | 8/1/2012 | 4601 Admiralty Way | Exterior | Wall | | Wood | C | Intact | Negative | 0.07 |
| 106 | 8/1/2012 | 4601 Admiralty Way | Exterior | Overhang | Facia | Wood | C | Intact | Negative | 0.01 |
| 107 | 8/1/2012 | 4601 Admiralty Way | Exterior | Overhang | Beam | Wood | C | Intact | Negative | 0.01 |
| 108 | 8/1/2012 | 4601 Admiralty Way | Exterior | Overhang | Ceiling | Wood | C | Intact | Negative | 0.05 |
| 109 | 8/1/2012 | 4601 Admiralty Way | Exterior | Wall | | Wood | D | Intact | Negative | 0.05 |
| 110 | 8/1/2012 | 4601 Admiralty Way | Exterior | Electric Box | | Wood | D | Intact | Negative | 0.07 |
| 111 | 8/1/2012 | 4601 Admiralty Way | Entry | Wall | | Drywall | A | Intact | Negative | 0.03 |
| 112 | 8/1/2012 | 4601 Admiralty Way | Entry | Wall | | Drywall | B | Intact | Negative | 0.05 |
| 113 | 8/1/2012 | 4601 Admiralty Way | Entry | Wall | | Drywall | C | Intact | Negative | 0.09 |
| 114 | 8/1/2012 | 4601 Admiralty Way | Entry | Wall | | Drywall | D | Intact | Negative | 0.05 |
| 115 | 8/1/2012 | 4601 Admiralty Way | Entry | Door | Frame | Wood | C | Intact | Negative | 0.21 |
| 116 | 8/1/2012 | 4601 Admiralty Way | Entry | Door | Jamb | Wood | C | Intact | Negative | 0.5 |
| 117 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Wall | | Drywall | A | Intact | Negative | 0.06 |
| 118 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 119 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Wall | | Drywall | C | Intact | Negative | 0.07 |
| 120 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Wall | | Drywall | D | Intact | Negative | 0.03 |
| 121 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Door | Frame | Wood | B | Intact | Negative | 0.16 |
| 122 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Door | Jamb | Wood | B | Intact | Negative | 0.4 |
| 123 | 8/1/2012 | 4601 Admiralty Way | Office 1 | Window | Frame | Wood | A | Intact | Negative | 0 |
| 124 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Wall | | Drywall | A | Intact | Negative | 0.11 |
| 125 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Wall | | Drywall | B | Intact | Negative | 0.3 |
| 126 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Wall | | Drywall | C | Intact | Negative | 0.05 |
| 127 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Wall | | Drywall | D | Intact | Negative | 0.03 |
| 128 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Window | Frame | Wood | A | Intact | Negative | 0 |
| 129 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Door | Jamb | Wood | D | Intact | Negative | 0.4 |
| 130 | 8/1/2012 | 4601 Admiralty Way | Office 2 | Door | Frame | Wood | D | Intact | Negative | 0.11 |
| 131 | 8/1/2012 | 4601 Admiralty Way | Hallway | Wall | | Drywall | A | Intact | Negative | 0.11 |
| 132 | 8/1/2012 | 4601 Admiralty Way | Hallway | Wall | | Drywall | C | Intact | Negative | 0.01 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 133 | 8/1/2012 | 4601 Admiralty Way | Office 3 | Wall | | Drywall | A | Intact | Negative | 0.03 |
| 134 | 8/1/2012 | 4601 Admiralty Way | Office 3 | Wall | | Drywall | B | Intact | Negative | 0.08 |
| 135 | 8/1/2012 | 4601 Admiralty Way | Office 3 | Wall | | Drywall | C | Intact | Negative | 0.09 |
| 136 | 8/1/2012 | 4601 Admiralty Way | Office 3 | Wall | | Drywall | D | Intact | Negative | 0.05 |
| 137 | 8/1/2012 | 4601 Admiralty Way | Office 3 | Door | Frame | Wood | B | Intact | Negative | 0.16 |
| 138 | 8/1/2012 | 4601 Admiralty Way | Office 3 | Door | Jamb | Wood | B | Intact | Negative | 0.11 |
| 139 | 8/1/2012 | 4601 Admiralty Way | Office 4 | Wall | | Drywall | A | Intact | Negative | 0.05 |
| 140 | 8/1/2012 | 4601 Admiralty Way | Office 4 | Wall | | Drywall | B | Intact | Negative | 0.03 |
| 141 | 8/1/2012 | 4601 Admiralty Way | Office 4 | Wall | | Drywall | C | Intact | Negative | 0.14 |
| 142 | 8/1/2012 | 4601 Admiralty Way | Office 4 | Wall | | Drywall | D | Intact | Negative | 0.5 |
| 143 | 8/1/2012 | 4601 Admiralty Way | Office 4 | Door | Frame | Wood | D | Intact | Negative | 0.11 |
| 144 | 8/1/2012 | 4601 Admiralty Way | Office 4 | Door | Jamb | Wood | D | Intact | Negative | 0.23 |
| 145 | 8/1/2012 | 4601 Admiralty Way | Restroom | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 146 | 8/1/2012 | 4601 Admiralty Way | Restroom | Wall | | Drywall | B | Intact | Negative | 0.05 |
| 147 | 8/1/2012 | 4601 Admiralty Way | Restroom | Wall | | Drywall | C | Intact | Negative | 0.08 |
| 148 | 8/1/2012 | 4601 Admiralty Way | Restroom | Wall | | Drywall | D | Intact | Negative | 0.04 |
| 149 | 8/1/2012 | 4601 Admiralty Way | Restroom | Door | Frame | Wood | A | Intact | Negative | 0.16 |
| 150 | 8/1/2012 | 4601 Admiralty Way | Restroom | Door | Jamb | Wood | A | Intact | Negative | 0.14 |
| 151 | 8/1/2012 | 13445 Mindanao Way | Bar Room | Wall | | Drywall | A | Intact | Negative | 0.04 |
| 152 | 8/1/2012 | 13445 Mindanao Way | Bar Room | Wall | | Drywall | B | Intact | Negative | 0.06 |
| 153 | 8/1/2012 | 13445 Mindanao Way | Bar Room | Wall | | Drywall | C | Intact | Negative | 0.04 |
| 154 | 8/1/2012 | 13445 Mindanao Way | Bar Room | Wall | | Drywall | D | Intact | Negative | 0.05 |
| 155 | 8/1/2012 | 13445 Mindanao Way | Storage | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 156 | 8/1/2012 | 13445 Mindanao Way | Storage | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 157 | 8/1/2012 | 13445 Mindanao Way | Storage | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 158 | 8/1/2012 | 13445 Mindanao Way | Storage | Wall | | Drywall | D | Intact | Negative | 0.02 |
| 159 | 8/1/2012 | 13445 Mindanao Way | Storage | Door | Frame | Wood | C | Intact | Negative | 0.15 |
| 160 | 8/1/2012 | 13445 Mindanao Way | Storage | Door | Jamb | Wood | C | Intact | Negative | 0.12 |
| 161 | 8/1/2012 | 13445 Mindanao Way | Kitchen | Wall | | Drywall | A | Intact | Negative | 0.08 |
| 162 | 8/1/2012 | 13445 Mindanao Way | Kitchen | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 163 | 8/1/2012 | 13445 Mindanao Way | Kitchen | Wall | | Drywall | C | Intact | Negative | 0.04 |
| 164 | 8/1/2012 | 13445 Mindanao Way | Kitchen | Wall | | Drywall | D | Intact | Negative | 0.4 |
| 165 | 8/1/2012 | 13445 Mindanao Way | Kitchen | Door | Frame | Metal | B | Intact | Negative | 0.01 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 166 | 8/1/2012 | 13445 Mindanao Way | Men's Restroom | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 167 | 8/1/2012 | 13445 Mindanao Way | Men's Restroom | Wall | | Drywall | B | Intact | Negative | 0.03 |
| 168 | 8/1/2012 | 13445 Mindanao Way | Men's Restroom | Wall | | Drywall | C | Intact | Negative | 0.07 |
| 169 | 8/1/2012 | 13445 Mindanao Way | Men's Restroom | Wall | | Drywall | D | Intact | Negative | 0.05 |
| 170 | 8/1/2012 | 13445 Mindanao Way | Men's Restroom | Door | Frame | Wood | B | Intact | Negative | 0.16 |
| 171 | 8/1/2012 | 13445 Mindanao Way | Men's Restroom | Door | Jamb | Wood | B | Intact | Negative | 0.14 |
| **172** | **8/1/2012** | **13445 Mindanao Way** | **Men's Restroom** | **Wall** | **Tile** | **Ceramic** | **C** | **Intact** | **Positive** | **11.1** |
| 173 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | A | Intact | Negative | 0.07 |
| 174 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | B | Intact | Negative | 0.19 |
| 175 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | C | Intact | Negative | 0.12 |
| 176 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | D | Intact | Negative | 0.01 |
| 177 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Ceiling | | Drywall | | Intact | Negative | 0.05 |
| 178 | 8/1/2012 | 13445 Mindanao Way | Shower | Wall | | Drywall | A | Intact | Negative | 0.08 |
| 179 | 8/1/2012 | 13445 Mindanao Way | Shower | Wall | | Drywall | B | Intact | Negative | 0.12 |
| 180 | 8/1/2012 | 13445 Mindanao Way | Shower | Wall | | Drywall | C | Intact | Negative | 0.05 |
| **181** | **8/1/2012** | **13445 Mindanao Way** | **Shower** | **Wall** | **Tile** | **Ceramic** | **D** | **Intact** | **Positive** | **12.3** |
| 182 | 8/1/2012 | 13445 Mindanao Way | Shower | Floor | Tile | Ceramic | | Intact | Negative | 0.14 |
| 183 | 8/1/2012 | 13445 Mindanao Way | Women's Restroom | Wall | | Drywall | A | Intact | Negative | 0.09 |
| 184 | 8/1/2012 | 13445 Mindanao Way | Women's Restroom | Wall | | Drywall | B | Intact | Negative | 0.07 |
| 185 | 8/1/2012 | 13445 Mindanao Way | Women's Restroom | Wall | | Drywall | C | Intact | Negative | 0.5 |
| 186 | 8/1/2012 | 13445 Mindanao Way | Women's Restroom | Wall | | Drywall | D | Intact | Negative | 0.08 |
| 187 | 8/1/2012 | 13445 Mindanao Way | Women's Restroom | Door | Frame | Wood | B | Intact | Negative | 0.07 |
| 188 | 8/1/2012 | 13445 Mindanao Way | Women's Restroom | Door | Jamb | Wood | B | Intact | Negative | 0.13 |
| **189** | **8/1/2012** | **13445 Mindanao Way** | **Women's Restroom** | **Wall** | **Tile** | **Ceramic** | **A** | **Intact** | **Positive** | **9.4** |
| 190 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | A | Intact | Negative | 0.08 |
| 191 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 192 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | C | Intact | Negative | 0.17 |
| 193 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Wall | | Drywall | D | Intact | Negative | 0.09 |
| 194 | 8/1/2012 | 13445 Mindanao Way | Changing Room | Ceiling | | Drywall | | Intact | Negative | 0.01 |
| 195 | 8/1/2012 | 13445 Mindanao Way | Shower | Wall | | Drywall | A | Intact | Negative | 0.02 |
| 196 | 8/1/2012 | 13445 Mindanao Way | Shower | Wall | | Drywall | B | Intact | Negative | 0.03 |
| 197 | 8/1/2012 | 13445 Mindanao Way | Shower | Wall | | Drywall | C | Intact | Negative | 0.1 |
| **198** | **8/1/2012** | **13445 Mindanao Way** | **Shower** | **Wall** | **Tile** | **Ceramic** | **D** | **Intact** | **Positive** | **12.6** |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 199 | 8/1/2012 | 13445 Mindanao Way | Shower | Floor | Tile | Ceramic | | Intact | Negative | 0.22 |
| 200 | 8/1/2012 | 13445 Mindanao Way | Exterior | Wall | | Wood | A | Intact | Negative | 0.08 |
| 201 | 8/1/2012 | 13445 Mindanao Way | Exterior | Window | Sill | Wood | A | Intact | Negative | 0 |
| 202 | 8/1/2012 | 13445 Mindanao Way | Exterior | Door | Frame | Wood | A | Intact | Negative | 0.16 |
| 203 | 8/1/2012 | 13445 Mindanao Way | Exterior | Door | Jamb | Wood | A | Intact | Negative | 0.3 |
| **204** | **8/1/2012** | **13445 Mindanao Way** | **Exterior** | **Ballard** | | **Concrete** | **A** | **Intact** | **Positive** | **6.9** |
| 205 | 8/1/2012 | 13445 Mindanao Way | Exterior | Stair | Riser | | D | Intact | Negative | 0 |
| 206 | 8/1/2012 | 13445 Mindanao Way | Exterior | Stair | Railing | Wood | D | Intact | Negative | 0.02 |
| 207 | 8/1/2012 | 13445 Mindanao Way | Exterior | Stair | Tread | Wood | D | Intact | Negative | 0.01 |
| 208 | 8/1/2012 | 13445 Mindanao Way | Exterior | Wall | | Wood | D | Intact | Negative | 0.06 |
| 209 | 8/1/2012 | 13445 Mindanao Way | Exterior | Overhang | Beam | Wood | D | Intact | Negative | 0.08 |
| 210 | 8/1/2012 | 13445 Mindanao Way | Exterior | Stair | Riser | Wood | B | Intact | Negative | 0.13 |
| 211 | 8/1/2012 | 13445 Mindanao Way | Exterior | Stair | Railing | Wood | B | Intact | Negative | 0.01 |
| 212 | 8/1/2012 | 13445 Mindanao Way | Exterior | Stair | Tread | Wood | B | Intact | Negative | 0.16 |
| 213 | 8/1/2012 | 13445 Mindanao Way | Exterior | Wall | | Wood | B | Intact | Negative | 0.06 |
| 214 | 8/1/2012 | 13445 Mindanao Way | Exterior | Overhang | Beam | Wood | B | Intact | Negative | 0.09 |
| 215 | 8/1/2012 | 13445 Mindanao Way | Exterior | Door | Frame | Wood | B | Intact | Negative | 0.01 |
| 216 | 8/1/2012 | 13445 Mindanao Way | Exterior | Door | Jamb | Wood | B | Intact | Negative | 0.26 |
| 217 | 8/1/2012 | 13445 Mindanao Way | Exterior | Wall | | Wood | C | Intact | Negative | 0.4 |
| 218 | 8/1/2012 | 13445 Mindanao Way | Exterior | Door | Frame | Wood | C | Intact | Negative | 0.15 |
| 219 | 8/1/2012 | 13445 Mindanao Way | Exterior | Door | Jamb | Wood | C | Intact | Negative | 0.2 |
| 220 | 8/1/2012 | 13445 Mindanao Way | Exterior | Window | Frame | Wood | C | Intact | Negative | 0 |
| 221 | 8/1/2012 | 13445 Mindanao Way | Exterior | Balcony | Railing | Wood | C | Intact | Negative | 0.3 |
| 222 | 8/1/2012 | 13445 Mindanao Way | Exterior | Balcony | Column | Wood | C | Intact | Negative | 0.4 |
| 223 | 8/1/2012 | 13445 Mindanao Way | Laundry | Wall | | Drywall | A | Intact | Negative | 0.03 |
| 224 | 8/1/2012 | 13445 Mindanao Way | Laundry | Wall | | Drywall | B | Intact | Negative | 0.4 |
| 225 | 8/1/2012 | 13445 Mindanao Way | Laundry | Wall | | Drywall | C | Intact | Negative | 0.03 |
| 226 | 8/1/2012 | 13445 Mindanao Way | Laundry | Wall | | Drywall | D | Intact | Negative | 0.06 |
| 227 | 8/1/2012 | 13445 Mindanao Way | Laundry | Door | Frame | Wood | C | Intact | Negative | 0.11 |
| 228 | 8/1/2012 | 13445 Mindanao Way | Laundry | Door | Jamb | Wood | C | Intact | Negative | 0.24 |
| 229 | 8/1/2012 | 13445 Mindanao Way | Laundry | Window | Frame | Wood | C | Intact | Negative | 0 |
| **230** | **8/1/2012** | **Calibration** | | | | | | | **Positive** | **1.2** |
| **231** | **8/1/2012** | **Calibration** | | | | | | | **Positive** | **1.2** |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| **232** | **8/1/2012** | **Calibration** | | | | | | | **Positive** | **1.1** |
| **233** | **8/2/2012** | **Shutter. Cal** | **Res. 388.64** | | | | | | | |
| **234** | **8/2/2012** | **Calibration** | | | | | | | **Positive** | **1** |
| **235** | **8/2/2012** | **Calibration** | | | | | | | **Positive** | **1** |
| **236** | **8/2/2012** | **Calibration** | | | | | | | **Positive** | **0.9** |
| 237 | 8/2/2012 | 4633 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.05 |
| 238 | 8/2/2012 | 4633 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 239 | 8/2/2012 | 4633 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.5 |
| 240 | 8/2/2012 | 4633 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.07 |
| 241 | 8/2/2012 | 4633 Admiralty Way | Main | Ceiling | Beam | Wood | | Intact | Negative | 0.4 |
| 242 | 8/2/2012 | 4633 Admiralty Way | Exterior | Wall | | Wood | A | Intact | Negative | 0.19 |
| 243 | 8/2/2012 | 4633 Admiralty Way | Exterior | Railing | | Metal | A | Intact | Negative | 0.01 |
| 244 | 8/2/2012 | 4633 Admiralty Way | Exterior | Column | | Wood | A | Intact | Negative | 0.15 |
| 245 | 8/2/2012 | 4633 Admiralty Way | Exterior | Overhang | Facia | Wood | A | Intact | Negative | 0.04 |
| 246 | 8/2/2012 | 4633 Admiralty Way | Exterior | Overhang | Beam | Wood | A | Intact | Negative | 0.3 |
| 247 | 8/2/2012 | 4633 Admiralty Way | Exterior | Overhang | Ceiling | Wood | A | Intact | Negative | 0.4 |
| 248 | 8/2/2012 | 4633 Admiralty Way | Exterior | Corner Molding | | Wood | A | Intact | Negative | 0.4 |
| 249 | 8/2/2012 | 4633 Admiralty Way | Exterior | Stair | Railing | Metal | A | Intact | Negative | 0.01 |
| 250 | 8/2/2012 | 4633 Admiralty Way | Exterior | Stair | Riser | Wood | A | Intact | Negative | 0.01 |
| 251 | 8/2/2012 | 4633 Admiralty Way | Exterior | Wall | | Wood | B | Intact | Negative | 0.19 |
| 252 | 8/2/2012 | 4633 Admiralty Way | Exterior | Wall | | Wood | C | Intact | Negative | 0.19 |
| 253 | 8/2/2012 | 4633 Admiralty Way | Exterior | Wall | | Wood | D | Intact | Negative | 0.27 |
| 254 | 8/2/2012 | 4633 Admiralty Way | Exterior | Overhang | Facia | Wood | D | Intact | Negative | 0.03 |
| 255 | 8/2/2012 | 4633 Admiralty Way | Exterior | Overhang | Beam | Wood | D | Intact | Negative | 0.02 |
| 256 | 8/2/2012 | 4633 Admiralty Way | Exterior | Overhang | Ceiling | Wood | D | Intact | Negative | 0.03 |
| 257 | 8/2/2012 | 4627 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.6 |
| 258 | 8/2/2012 | 4627 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.6 |
| 259 | 8/2/2012 | 4627 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.09 |
| 260 | 8/2/2012 | 4627 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.12 |
| 261 | 8/2/2012 | 4627 Admiralty Way | Main | Ceiling | Beam | Wood | | Intact | Negative | 0.4 |
| 262 | 8/2/2012 | 4627 Admiralty Way | Main | Ceiling | | Drywall | | Intact | Negative | 0.07 |
| 263 | 8/2/2012 | 4627 Admiralty Way | Restroom | Wall | | Drywall | A | Intact | Negative | 0.06 |
| 264 | 8/2/2012 | 4627 Admiralty Way | Restroom | Wall | | Drywall | B | Intact | Negative | 0.4 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 8/2/2012 | 4627 Admiralty Way | Restroom | Wall | | Drywall | C | Intact | Negative | 0.03 |
| 266 | 8/2/2012 | 4627 Admiralty Way | Restroom | Wall | | Drywall | D | Intact | Negative | 0.5 |
| 267 | 8/2/2012 | 4627 Admiralty Way | Restroom | Ceiling | | Drywall | | Intact | Negative | 0.18 |
| 268 | 8/2/2012 | 4627 Admiralty Way | Restroom | Door | Frame | Wood | A | Intact | Negative | 0.4 |
| 269 | 8/2/2012 | 4627 Admiralty Way | Restroom | Door | Jamb | Wood | A | Intact | Negative | 0.3 |
| **270** | **8/2/2012** | **4627 Admiralty Way** | **Restroom** | **Wall** | **Tile** | **Ceramic** | **C** | **Intact** | **Positive** | **11.1** |
| 271 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Wall | | Drywall | A | Intact | Negative | 0.08 |
| 272 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Wall | | Drywall | B | Intact | Negative | 0.6 |
| 273 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Wall | | Drywall | C | Intact | Negative | 0.6 |
| 274 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Wall | | Drywall | D | Intact | Negative | 0.6 |
| 275 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Door | Frame | Wood | A | Intact | Negative | 0.01 |
| 276 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Door | Jamb | Wood | A | Intact | Negative | 0.01 |
| 277 | 8/2/2012 | 4627 Admiralty Way | Public Women's RR | Floor | Tile | Ceramic | | Intact | Negative | 0.16 |
| 278 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Wall | | Drywall | A | Intact | Negative | 0.06 |
| 279 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 280 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Wall | | Drywall | C | Intact | Negative | 0.03 |
| 281 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Wall | | Drywall | D | Intact | Negative | 0.09 |
| 282 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Door | Jamb | Wood | A | Intact | Negative | 0.01 |
| 283 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Door | Frame | Wood | A | Intact | Negative | 0.03 |
| 284 | 8/2/2012 | 4627 Admiralty Way | Public Men's RR | Floor | Tile | Ceramic | | Intact | Negative | 0.09 |
| 285 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Wall | | Drywall | A | Intact | Negative | 0.05 |
| 286 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Wall | | Drywall | B | Intact | Negative | 0.04 |
| 287 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Wall | | Drywall | C | Intact | Negative | 0.03 |
| 288 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Wall | | Drywall | D | Intact | Negative | 0.06 |
| 289 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Wall | | Brick | A | Intact | Negative | 0.1 |
| 290 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Wall | | Brick | C | Intact | Negative | 0.17 |
| 291 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Ceiling | | Drywall | | Intact | Negative | 0.02 |
| 292 | 8/2/2012 | 13444 Bali Way 1st Flr | Entry | Door | Frame | Wood | A | Intact | Negative | 0.02 |
| 293 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Wall | | Brick | A | Intact | Negative | 0.05 |
| 294 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Wall | | Wood | B | Intact | Negative | 0.01 |
| 295 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Wall | | Drywall | C | Intact | Negative | 0.1 |
| 296 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Wall | | Drywall | D | Intact | Negative | 0.04 |
| 297 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Ceiling | | Drywall | | Intact | Negative | 0.01 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 298 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Door | Frame | Wood | D | Intact | Negative | 0.01 |
| 299 | 8/2/2012 | 13444 Bali Way 1st Flr | Conference Room | Door | | Wood | D | Intact | Negative | 0.4 |
| 300 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Wall | | Drywall | A | Intact | Negative | 0.07 |
| 301 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Wall | | Brick | B | Intact | Negative | 0.01 |
| 302 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Wall | | Drywall | C | Intact | Negative | 0.07 |
| 303 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Ceiling | | Wood | D | Intact | Negative | 0.12 |
| 304 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Column | | Wood | | Intact | Negative | 0.2 |
| 305 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Window | Frame | Wood | C | Intact | Negative | 0 |
| 306 | 8/2/2012 | 13444 Bali Way 1st Flr | Office 1 | Door | Frame | Wood | B | Intact | Negative | 0.5 |
| 307 | 8/2/2012 | 13444 Bali Way 1st Flr | Hallway | Wall | | Drywall | A | Intact | Negative | 0.04 |
| 308 | 8/2/2012 | 13444 Bali Way 1st Flr | Hallway | Wall | | Brick | C | Intact | Negative | 0.12 |
| 309 | 8/2/2012 | 13444 Bali Way 1st Flr | Restroom | Wall | | Drywall | A | Intact | Negative | 0.1 |
| 310 | 8/2/2012 | 13444 Bali Way 1st Flr | Restroom | Wall | | Drywall | B | Intact | Negative | 0.07 |
| 311 | 8/2/2012 | 13444 Bali Way 1st Flr | Restroom | Wall | | Drywall | C | Intact | Negative | 0.06 |
| 312 | 8/2/2012 | 13444 Bali Way 1st Flr | Restroom | Wall | | Drywall | D | Intact | Negative | 0.04 |
| **313** | **8/2/2012** | **13444 Bali Way 1st Flr** | **Restroom** | **Wall** | **Tile** | **Ceramic** | **A** | **Intact** | **Positive** | **10.8** |
| 314 | 8/2/2012 | 13444 Bali Way 1st Flr | Restroom | Door | Frame | Wood | C | Intact | Negative | 0.04 |
| 315 | 8/2/2012 | 13444 Bali Way 1st Flr | Restroom | Door | Jamb | Wood | C | Intact | Negative | 0.01 |
| 316 | 8/2/2012 | 13444 Bali Way 1st Flr | Storage | Wall | | Drywall | A | Intact | Negative | 0.29 |
| 317 | 8/2/2012 | 13444 Bali Way 1st Flr | Storage | Wall | | Drywall | B | Intact | Negative | 0.03 |
| 318 | 8/2/2012 | 13444 Bali Way 1st Flr | Storage | Wall | | Drywall | C | Intact | Negative | 0.03 |
| 319 | 8/2/2012 | 13444 Bali Way 1st Flr | Storage | Wall | | Drywall | D | Intact | Negative | 0.04 |
| 320 | 8/2/2012 | 13444 Bali Way 1st Flr | Storage | Door | Frame | Wood | A | Intact | Negative | 0.03 |
| 321 | 8/2/2012 | 13444 Bali Way 1st Flr | Storage | Door | Jamb | Wood | A | Intact | Negative | 0.3 |
| **322** | **8/2/2012** | **13444 Bali Way 1st Flr** | **Storage** | **Wall** | **Tile** | **Ceramic** | **D** | **Intact** | **Positive** | **12.1** |
| 323 | 8/2/2012 | 13444 Bali Way 2nd Flr | Entry | Wall | | Wood | A | Intact | Negative | 0.02 |
| 324 | 8/2/2012 | 13444 Bali Way 2nd Flr | Entry | Wall | | Wood | B | Intact | Negative | 0.21 |
| 325 | 8/2/2012 | 13444 Bali Way 2nd Flr | Entry | Wall | | Wood | C | Intact | Negative | 0.5 |
| 326 | 8/2/2012 | 13444 Bali Way 2nd Flr | Entry | Wall | | Wood | D | Intact | Negative | 0.16 |
| 327 | 8/2/2012 | 13444 Bali Way 2nd Flr | Entry | Ceiling | | Wood | | Intact | Negative | 0.16 |
| 328 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Wall | | Drywall | A | Intact | Negative | 0 |
| 329 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 330 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Wall | | Brick | C | Intact | Negative | 0.11 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 331 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Wall | | Drywall | D | Intact | Negative | 0 |
| 332 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Ceiling | Beam | Wood | | Intact | Negative | 0.14 |
| 333 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Door | Frame | Wood | D | Intact | Negative | 0.4 |
| 334 | 8/2/2012 | 13444 Bali Way 2nd Flr | Lounge | Door | Jamb | Wood | D | Intact | Negative | 0.4 |
| 335 | 8/2/2012 | 13444 Bali Way | Exterior | Wall | | Brick | A | Intact | Negative | 0.01 |
| 336 | 8/2/2012 | 13444 Bali Way | Exterior | Beam | | Wood | A | Intact | Negative | 0.24 |
| 337 | 8/2/2012 | 13444 Bali Way | Exterior | Overhang | Beam | Wood | A | Intact | Negative | 0.02 |
| 338 | 8/2/2012 | 13444 Bali Way | Exterior | Overhang | Facia | Wood | A | Intact | Negative | 0.04 |
| 339 | 8/2/2012 | 13444 Bali Way | Exterior | Overhang | Ceiling | Wood | A | Intact | Negative | 0.04 |
| 340 | 8/2/2012 | 13444 Bali Way | Exterior | Stair | Riser | Wood | A | Intact | Negative | 0.01 |
| 341 | 8/2/2012 | 13444 Bali Way | Exterior | Stair | Tread | Wood | A | Intact | Negative | 0.02 |
| 342 | 8/2/2012 | 13444 Bali Way | Exterior | Column | | Wood | A | Intact | Negative | 0.11 |
| 343 | 8/2/2012 | 13444 Bali Way | Exterior | Window | Frame | Wood | A | Intact | Negative | 0 |
| 344 | 8/2/2012 | 13444 Bali Way | Storage | Wall | | Brick | A | Intact | Negative | 0.03 |
| 345 | 8/2/2012 | 13444 Bali Way | Storage | Wall | | Plaster | B | Intact | Negative | 0.01 |
| 346 | 8/2/2012 | 13444 Bali Way | Storage | Wall | | Plaster | C | Intact | Negative | 0.01 |
| 347 | 8/2/2012 | 13444 Bali Way | Storage | Wall | | Brick | D | Intact | Negative | 0.11 |
| 348 | 8/2/2012 | 13444 Bali Way | Storage | Ceiling | | Stucco | | Intact | Negative | 0.02 |
| 349 | 8/2/2012 | 13444 Bali Way | Exterior | Wall | | Brick | D | Intact | Negative | 0.15 |
| 350 | 8/2/2012 | 13444 Bali Way | Exterior | Wall | | Stucco | D | Intact | Negative | 0.01 |
| 351 | 8/2/2012 | 13444 Bali Way | Exterior | Stair | Railing | Wood | D | Intact | Negative | 0.01 |
| 352 | 8/2/2012 | 13444 Bali Way | Exterior | Stair | Riser | Wood | D | Intact | Negative | 0.06 |
| 353 | 8/2/2012 | 13444 Bali Way | Exterior | Stair | Tread | Wood | D | Intact | Negative | 0.03 |
| 354 | 8/2/2012 | 13444 Bali Way | Exterior | Door | Frame | Wood | D | Intact | Negative | 0.04 |
| 355 | 8/2/2012 | 13444 Bali Way | Exterior | Door | Jamb | Wood | D | Intact | Negative | 0.01 |
| 356 | 8/2/2012 | 13444 Bali Way | Exterior | Overhang | Ceiling | Wood | D | Intact | Negative | 0.4 |
| 357 | 8/2/2012 | 13444 Bali Way | Exterior | Overhang | Facia | Wood | D | Intact | Negative | 0.04 |
| 358 | 8/2/2012 | 13444 Bali Way | Exterior | Overhang | Beam | Wood | D | Intact | Negative | 0.02 |
| 359 | 8/2/2012 | 13444 Bali Way | Exterior | Balcony | Railing | Wood | D | Intact | Negative | 0.15 |
| 360 | 8/2/2012 | 13444 Bali Way | Exterior | Balcony | Floor | Wood | D | Intact | Negative | 0.3 |
| 361 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Wall | | Drywall | A | Intact | Negative | 0 |
| 362 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 363 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Wall | | Drywall | C | Intact | Negative | 0.01 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 364 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Wall | | Drywall | D | Intact | Negative | 0.01 |
| 365 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Ceiling | Beam | Wood | | Intact | Negative | 0.13 |
| 366 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Door | Frame | Wood | D | Intact | Negative | 0.28 |
| 367 | 8/2/2012 | 13444 Bali Way 2nd Flr | A.B.P.B Main | Door | Jamb | Wood | | Intact | Negative | 0.4 |
| 368 | 8/2/2012 | 13444 Bali Way 2nd Flr | Kitchen | Wall | | Brick | A | Intact | Negative | 0.03 |
| 369 | 8/2/2012 | 13444 Bali Way 2nd Flr | Kitchen | Wall | | Plaster | B | Intact | Negative | 0.01 |
| 370 | 8/2/2012 | 13444 Bali Way 2nd Flr | Kitchen | Wall | | Plaster | C | Intact | Negative | 0.01 |
| 371 | 8/2/2012 | 13444 Bali Way 2nd Flr | Kitchen | Wall | | Brick | D | Intact | Negative | 0.14 |
| 372 | 8/2/2012 | 13444 Bali Way 2nd Flr | Kitchen | Window | Frame | Wood | D | Intact | Negative | 0 |
| 373 | 8/2/2012 | 13444 Bali Way | Men's Restroom | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 374 | 8/2/2012 | 13444 Bali Way | Men's Restroom | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 375 | 8/2/2012 | 13444 Bali Way | Men's Restroom | Wall | | Drywall | C | Intact | Negative | 0.02 |
| 376 | 8/2/2012 | 13444 Bali Way | Men's Restroom | Wall | | Drywall | D | Intact | Negative | 0.01 |
| **377** | **8/2/2012** | **13444 Bali Way** | **Men's Restroom** | **Wall** | **Tile** | **Ceramic** | **C** | **Intact** | **Positive** | **8.1** |
| 378 | 8/2/2012 | 13444 Bali Way | Men's Restroom | Ceiling | | Drywall | | Intact | Negative | 0.05 |
| **379** | **8/2/2012** | **13444 Bali Way** | **Men's Restroom** | **Floor** | **Tile** | **Ceramic** | | **Intact** | **Positive** | **12.2** |
| 380 | 8/2/2012 | 13444 Bali Way | Men's Restroom | Door | Frame | Wood | C | Intact | Negative | 0.03 |
| 381 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 382 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Wall | | Drywall | B | Intact | Negative | 0.02 |
| 383 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 384 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Wall | | Drywall | D | Intact | Negative | 0.01 |
| **385** | **8/2/2012** | **13444 Bali Way** | **Women's Restroom** | **Wall** | **Tile** | **Ceramic** | **B** | **Intact** | **Positive** | **8.6** |
| 386 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Ceiling | | Drywall | | Intact | Negative | 0.19 |
| 387 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Floor | Tile | Ceramic | | Intact | Negative | 0.04 |
| 388 | 8/2/2012 | 13444 Bali Way | Women's Restroom | Door | Frame | Wood | C | Intact | Negative | 0.03 |
| 389 | 8/2/2012 | 4631 Admiralty Way | Main | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 390 | 8/2/2012 | 4631 Admiralty Way | Main | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 391 | 8/2/2012 | 4631 Admiralty Way | Main | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 392 | 8/2/2012 | 4631 Admiralty Way | Main | Wall | | Drywall | D | Intact | Negative | 0.01 |
| 393 | 8/2/2012 | 4631 Admiralty Way | Main | Ceiling | Beam | Wood | | Intact | Negative | 0.16 |
| 394 | 8/2/2012 | 4631 Admiralty Way | Main | Door | Frame | Wood | A | Intact | Negative | 0.03 |
| 395 | 8/2/2012 | 4631 Admiralty Way | Main | Door | Jamb | Wood | A | Intact | Negative | 0.01 |
| 396 | 8/2/2012 | 4631 Admiralty Way | Storage | Wall | | Drywall | A | Intact | Negative | 0.02 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 397 | 8/2/2012 | 4631 Admiralty Way | Storage | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 398 | 8/2/2012 | 4631 Admiralty Way | Storage | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 399 | 8/2/2012 | 4631 Admiralty Way | Storage | Wall | | Drywall | D | Intact | Negative | 0.01 |
| 400 | 8/2/2012 | 4631 Admiralty Way | Storage | Ceiling | | Drywall | | Intact | Negative | 0.03 |
| 401 | 8/2/2012 | 4631 Admiralty Way | Storage | Door | Frame | Wood | B | Intact | Negative | 0.07 |
| 402 | 8/2/2012 | 4631 Admiralty Way | Storage | Door | Jamb | Wood | B | Intact | Negative | 0.02 |
| 403 | 8/2/2012 | 13441 Mindanao Way | Office 1 | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 404 | 8/2/2012 | 13441 Mindanao Way | Office 1 | Wall | | Wood | B | Intact | Negative | 0.01 |
| 405 | 8/2/2012 | 13441 Mindanao Way | Office 1 | Wall | | Wood | C | Intact | Negative | 0.03 |
| 406 | 8/2/2012 | 13441 Mindanao Way | Office 1 | Wall | | Wood | D | Intact | Negative | 0.4 |
| 407 | 8/2/2012 | 13441 Mindanao Way | Office 1 | Door | Frame | Wood | D | Intact | Negative | 0.02 |
| 408 | 8/2/2012 | 13441 Mindanao Way | Office 1 | Door | Jamb | Wood | D | Intact | Negative | 0.01 |
| 409 | 8/2/2012 | 13441 Mindanao Way | Parts Room 1 | Wall | | Wood | A | Intact | Negative | 0.4 |
| 410 | 8/2/2012 | 13441 Mindanao Way | Parts Room 1 | Wall | | Wood | B | Intact | Negative | 0.01 |
| 411 | 8/2/2012 | 13441 Mindanao Way | Parts Room 1 | Wall | | Wood | C | Intact | Negative | 0.08 |
| 412 | 8/2/2012 | 13441 Mindanao Way | Parts Room 1 | Wall | | Wood | D | Intact | Negative | 0.03 |
| 413 | 8/2/2012 | 13441 Mindanao Way | Parts Room 2 | Wall | | Wood | A | Intact | Negative | 0.11 |
| 414 | 8/2/2012 | 13441 Mindanao Way | Parts Room 2 | Wall | | Wood | B | Intact | Negative | 0.03 |
| 415 | 8/2/2012 | 13441 Mindanao Way | Parts Room 2 | Wall | | Wood | C | Intact | Negative | 0.03 |
| 416 | 8/2/2012 | 13441 Mindanao Way | Parts Room 2 | Wall | | Wood | D | Intact | Negative | 0.16 |
| 417 | 8/2/2012 | 13441 Mindanao Way | Parts Room 2 | Ceiling | | Wood | | Intact | Negative | 0.3 |
| 418 | 8/2/2012 | 13441 Mindanao Way | Storage Closet | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 419 | 8/2/2012 | 13441 Mindanao Way | Storage Closet | Wall | | Drywall | B | Intact | Negative | 0.01 |
| 420 | 8/2/2012 | 13441 Mindanao Way | Storage Closet | Wall | | Drywall | C | Intact | Negative | 0.3 |
| 421 | 8/2/2012 | 13441 Mindanao Way | Storage Closet | Wall | | Drywall | D | Intact | Negative | 0.01 |
| 422 | 8/2/2012 | 13441 Mindanao Way | Storage Closet | Ceiling | | Drywall | | Intact | Negative | 0.07 |
| 423 | 8/2/2012 | 13441 Mindanao Way | Parts Room 3 | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 424 | 8/2/2012 | 13441 Mindanao Way | Parts Room 3 | Wall | | Brick | B | Intact | Negative | 0.09 |
| 425 | 8/2/2012 | 13441 Mindanao Way | Parts Room 3 | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 426 | 8/2/2012 | 13441 Mindanao Way | Parts Room 3 | Wall | | Drywall | D | Intact | Negative | 0.01 |
| 427 | 8/2/2012 | 13441 Mindanao Way | Parts Room 4 | Wall | | Brick | D | Intact | Negative | 0.03 |
| 428 | 8/2/2012 | 13441 Mindanao Way | Parts Room 4 | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 429 | 8/2/2012 | 13441 Mindanao Way | Parts Room 4 | Wall | | Drywall | B | Intact | Negative | 0.01 |

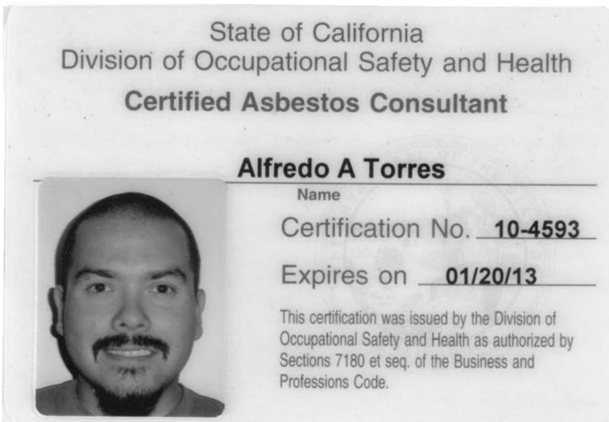
XRF Data Marina Del Rey Surveys

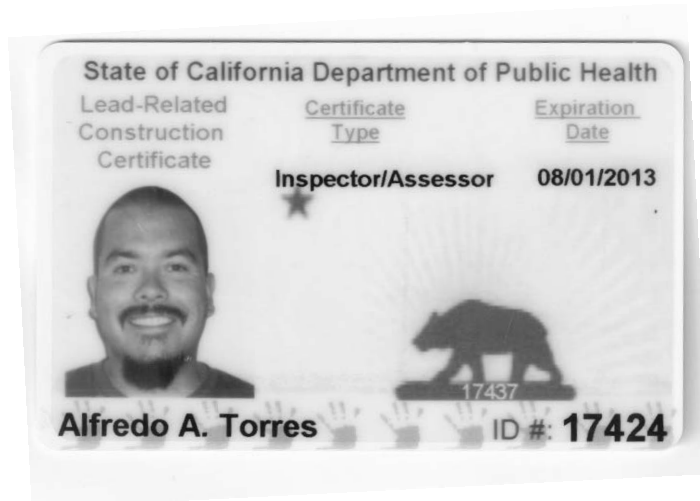
| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| 430 | 8/2/2012 | 13441 Mindanao Way | Parts Room 4 | Wall | | Stucco | C | Intact | Negative | 0.01 |
| 431 | 8/2/2012 | 13441 Mindanao Way | Parts Room 4 | Ceiling | | Wood | | Intact | Negative | 0.26 |
| 432 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Brick | D | Intact | Negative | 0.05 |
| 433 | 8/2/2012 | 13441 Mindanao Way | Exterior | Overhang | Ceiling | Wood | D | Intact | Negative | 0.04 |
| 434 | 8/2/2012 | 13441 Mindanao Way | Exterior | Overhang | Facia | Wood | D | Intact | Negative | 0.4 |
| 435 | 8/2/2012 | 13441 Mindanao Way | Exterior | Overhang | Beam | Wood | D | Intact | Negative | 0.01 |
| 436 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Wood | C | Intact | Negative | 0.01 |
| 437 | 8/2/2012 | 13441 Mindanao Way | Exterior | Door | Frame | Wood | C | Intact | Negative | 0.09 |
| 438 | 8/2/2012 | 13441 Mindanao Way | Exterior | Door | Jamb | Wood | C | Intact | Negative | 0.01 |
| 439 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Wood | C | Intact | Negative | 0.01 |
| 440 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Brick | C | Intact | Negative | 0.04 |
| 441 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Stucco | B | Intact | Negative | 0.02 |
| 442 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Stucco | B | Intact | Negative | 0.01 |
| 443 | 8/2/2012 | 13441 Mindanao Way | Exterior | Window | Frame | Wood | D | Intact | Negative | 0 |
| 444 | 8/2/2012 | 13441 Mindanao Way | Exterior | Wall | | Stucco | A | Intact | Negative | 0.01 |
| 445 | 8/2/2012 | 13441 Mindanao Way | Exterior | Overhang | Ceiling | Wood | A | Intact | Negative | 0.02 |
| 446 | 8/2/2012 | 13441 Mindanao Way | Exterior | Overhang | Beam | Wood | A | Intact | Negative | 0.02 |
| 447 | 8/2/2012 | 13441 Mindanao Way | Exterior | Overhang | Facia | Wood | A | Intact | Negative | 0.07 |
| 448 | 8/2/2012 | 13441 Mindanao Way | Janitor Closet | Wall | | Drywall | A | Intact | Negative | 0.01 |
| 449 | 8/2/2012 | 13441 Mindanao Way | Janitor Closet | Wall | | Drywall | B | Intact | Negative | 0.02 |
| 450 | 8/2/2012 | 13441 Mindanao Way | Janitor Closet | Wall | | Drywall | C | Intact | Negative | 0.01 |
| 451 | 8/2/2012 | 13441 Mindanao Way | Janitor Closet | Wall | | Drywall | D | Intact | Negative | 0.02 |
| 452 | 8/2/2012 | 13441 Mindanao Way | Janitor Closet | Ceiling | | Drywall | | Intact | Negative | 0.02 |
| 453 | 8/2/2012 | 13441 Mindanao Way | Men's Restroom | Wall | | Brick | A | Intact | Negative | 0.05 |
| 454 | 8/2/2012 | 13441 Mindanao Way | Men's Restroom | Wall | | Brick | B | Intact | Negative | 0.04 |
| 455 | 8/2/2012 | 13441 Mindanao Way | Men's Restroom | Wall | | Brick | C | Intact | Negative | 0.11 |
| 456 | 8/2/2012 | 13441 Mindanao Way | Men's Restroom | Wall | | Brick | D | Intact | Negative | 0.09 |
| 457 | 8/2/2012 | 13441 Mindanao Way | Men's Restroom | Floor | Tile | Ceramic | | Intact | Negative | 0.15 |
| **458** | **8/2/2012** | **13441 Mindanao Way** | **Men's Restroom** | **Wall** | **Tile** | **Ceramic** | **A** | **Intact** | **Positive** | **9.5** |
| 459 | 8/2/2012 | 13441 Mindanao Way | Women's Restroom | Wall | | Brick | A | Intact | Negative | 0.08 |
| 460 | 8/2/2012 | 13441 Mindanao Way | Women's Restroom | Wall | | Brick | B | Intact | Negative | 0.03 |
| 461 | 8/2/2012 | 13441 Mindanao Way | Women's Restroom | Wall | | Brick | C | Intact | Negative | 0.14 |
| 462 | 8/2/2012 | 13441 Mindanao Way | Women's Restroom | Wall | | Brick | D | Intact | Negative | 0.02 |

XRF Data Marina Del Rey Surveys

| Shot | Date | Address | Room | Component | Sub-Component | Substrate | Side | Condition | Results | PbC |
|---|---|---|---|---|---|---|---|---|---|---|
| **463** | **8/2/2012** | **13441 Mindanao Way** | **Women's Restroom** | **Wall** | **Tile** | **Ceramic** | **D** | **Intact** | **Positive** | **9.7** |
| 464 | 8/2/2012 | 13441 Mindanao Way | Women's Restroom | Floor | Tile | Ceramic | | Intact | Negative | 0.08 |
| **465** | **8/2/2012** | **Calibration** | | | | | | | **Positive** | **1** |
| **466** | **8/2/2012** | **Calibration** | | | | | | | **Positive** | **1.1** |
| **467** | **8/2/2012** | **Calibration** | | | | | | | **Positive** | **1.2** |
| | **Total Readings** | | **467** | | | **Action Level -** | | **0.7** | | |
| | **Positive Readings** | | **14** | | | **Units** | | **mg/cm^2** | | |

Alfredo Torres
California DOSH **Certified Asbestos Consultant** (CAC) #**10-4593**
California DPH **Certified Lead Inspector Assessor** (CLIA) #17424



# LEAD HAZARD EVALUATION REPORT

**Section 1 — Date of Lead Hazard Evaluation** 08-01-2012

**Section 2 — Type of Lead Hazard Evaluation (Check one box only)**

☑ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ______

**Section 3 — Structure Where Lead Hazard Evaluation Was Conducted**

| Address [number, street, apartment (if applicable)] | City | County | Zip Code |
|---|---|---|---|
| 13445 Mindanao Way | Marina Del Rey | Los Angeles | 90292 |

| Construction date (year) of structure | Type of structure | Children living in structure? |
|---|---|---|
| | ☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ☑ Other Commercial | ☐ Yes ☑ No ☐ Don't Know |

**Section 4 — Owner of Structure (if business/agency, list contact person)**

| Name | Telephone number |
|---|---|
| | |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
| | | | |

**Section 5 — Results of Lead Hazard Evaluation (check all that apply)**

☐ No lead-based paint detected ☑ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other______

**Section 6 — Individual Conducting Lead Hazard Evaluation**

| Name | Telephone number |
|---|---|
| Alfredo Torres | 310-200-4006 |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
| 1204 S Patton Ave | San Pedro, | Ca | 90731 |

| CDPH certification number | Signature | Date |
|---|---|---|
| 17424 | [signature] | 08-17-2012 |

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

**Section 7 — Attachments**

A. A foundation diagram or sketch of the structure indicating the specifc locations of each lead hazard or presence of lead-based paint;
B. Each testing method, device, and sampling procedure used;
C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

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Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

# LEAD HAZARD EVALUATION REPORT

**Section 1 — Date of Lead Hazard Evaluation** 08-01-2012

**Section 2 — Type of Lead Hazard Evaluation (Check one box only)**

✓ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ______

**Section 3 — Structure Where Lead Hazard Evaluation Was Conducted**

| Address [number, street, apartment (if applicable)] | City | County | Zip Code |
|---|---|---|---|
| 4695 Admiralty Way | Marina Del Rey | Los Angeles | 90292 |

| Construction date (year) of structure | Type of structure | Children living in structure? |
|---|---|---|
| | ☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ✓ Other Commercial | ☐ Yes ✓ No ☐ Don't Know |

**Section 4 — Owner of Structure (if business/agency, list contact person)**

| Name | | | Telephone number |
|---|---|---|---|
| | | | |
| **Address [number, street, apartment (if applicable)]** | **City** | **State** | **Zip Code** |
| | | | |

**Section 5 — Results of Lead Hazard Evaluation (check all that apply)**

✓ No lead-based paint detected ☐ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other______

**Section 6 — Individual Conducting Lead Hazard Evaluation**

| Name | | | Telephone number |
|---|---|---|---|
| Alfredo Torres | | | 310-200-4006 |
| **Address [number, street, apartment (if applicable)]** | **City** | **State** | **Zip Code** |
| 1204 S Patton Ave | San Pedro, | Ca | 90731 |
| **CDPH certification number** | **Signature** | | **Date** |
| 17424 | [signature] | | 08-17-2012 |

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

**Section 7 — Attachments**

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# LEAD HAZARD EVALUATION REPORT

**Section 1 — Date of Lead Hazard Evaluation** 08-02-2012

**Section 2 — Type of Lead Hazard Evaluation (Check one box only)**

✓ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ______

**Section 3 — Structure Where Lead Hazard Evaluation Was Conducted**

| Address [number, street, apartment (if applicable)] | City | County | Zip Code |
|---|---|---|---|
| 4625-4637 Admiralty Way | Marina Del Rey | Los Angeles | 90292 |

| Construction date (year) of structure | Type of structure | | Children living in structure? |
|---|---|---|---|
| | ☐ Multi-unit building | ☐ School or daycare | ☐ Yes ✓ No |
| | ☐ Single family dwelling | ✓ Other Commercial | ☐ Don't Know |

**Section 4 — Owner of Structure (if business/agency, list contact person)**

| Name | Telephone number |
|---|---|
| | |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
| | | | |

**Section 5 — Results of Lead Hazard Evaluation (check all that apply)**

☐ No lead-based paint detected ✓ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other______

**Section 6 — Individual Conducting Lead Hazard Evaluation**

| Name | Telephone number |
|---|---|
| Alfredo Torres | 310-200-4006 |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
| 1204 S Patton Ave | San Pedro, | Ca | 90731 |

| CDPH certification number | Signature | Date |
|---|---|---|
| 17424 | | 08-17-2012 |

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# LEAD HAZARD EVALUATION REPORT

**Section 1 — Date of Lead Hazard Evaluation** 08-01-2012

**Section 2 — Type of Lead Hazard Evaluation (Check one box only)**

✓ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ____

**Section 3 — Structure Where Lead Hazard Evaluation Was Conducted**

| Address [number, street, apartment (if applicable)] | City | County | Zip Code |
|---|---|---|---|
| 4601 Admiralty Way | Marina Del Rey | Los Angeles | 90292 |

| Construction date (year) of structure | Type of structure | Children living in structure? |
|---|---|---|
| | ☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ✓ Other Commercial | ☐ Yes ✓ No ☐ Don't Know |

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# LEAD HAZARD EVALUATION REPORT

**Section 1 — Date of Lead Hazard Evaluation** 08-02-2012

**Section 2 — Type of Lead Hazard Evaluation (Check one box only)**

✓ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ______

**Section 3 — Structure Where Lead Hazard Evaluation Was Conducted**

| Address [number, street, apartment (if applicable)] | City | County | Zip Code |
|---|---|---|---|
| 13444 Bali Way | Marina Del Rey | Los Angeles | 90292 |

| Construction date (year) of structure | Type of structure | Children living in structure? |
|---|---|---|
| | ☐ Multi-unit building ☐ School or daycare<br>☐ Single family dwelling ✓ Other Commercial | ☐ Yes ✓ No<br>☐ Don't Know |

**Section 4 — Owner of Structure (if business/agency, list contact person)**

| Name | Telephone number |
|---|---|
| | |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
| | | | |

**Section 5 — Results of Lead Hazard Evaluation (check all that apply)**

☐ No lead-based paint detected ✓ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

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**Section 6 — Individual Conducting Lead Hazard Evaluation**

| Name | Telephone number |
|---|---|
| Alfredo Torres | 310-200-4006 |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
| 1204 S Patton Ave | San Pedro, | Ca | 90731 |

| CDPH certification number | Signature | Date |
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☑ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ____________

**Section 3 — Structure Where Lead Hazard Evaluation Was Conducted**

| Address [number, street, apartment (if applicable)] | City | County | Zip Code |
|---|---|---|---|
| 13441 Mindanao Way | Marina Del Rey | Los Angeles | 90292 |

Construction date (year) of structure:

Type of structure: ☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ☑ Other Commercial

Children living in structure? ☐ Yes ☑ No ☐ Don't Know

**Section 4 — Owner of Structure (if business/agency, list contact person)**

| Name | Telephone number |
|---|---|
| | |

| Address [number, street, apartment (if applicable)] | City | State | Zip Code |
|---|---|---|---|
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|---|---|---|---|
| 1204 S Patton Ave | San Pedro, | Ca | 90731 |

| CDPH certification number | Signature | Date |
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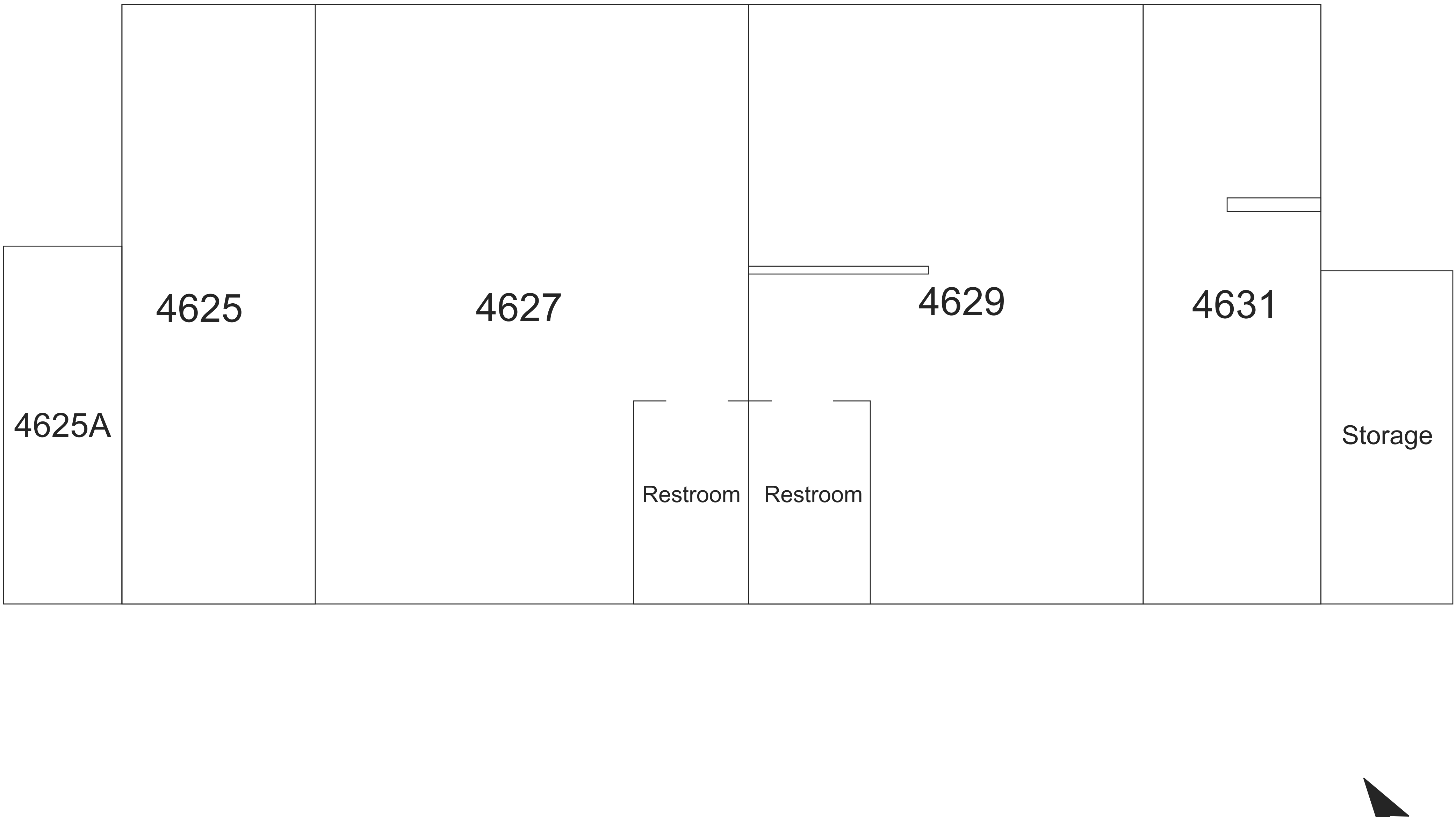
3 - 2 story
4 - 1 story

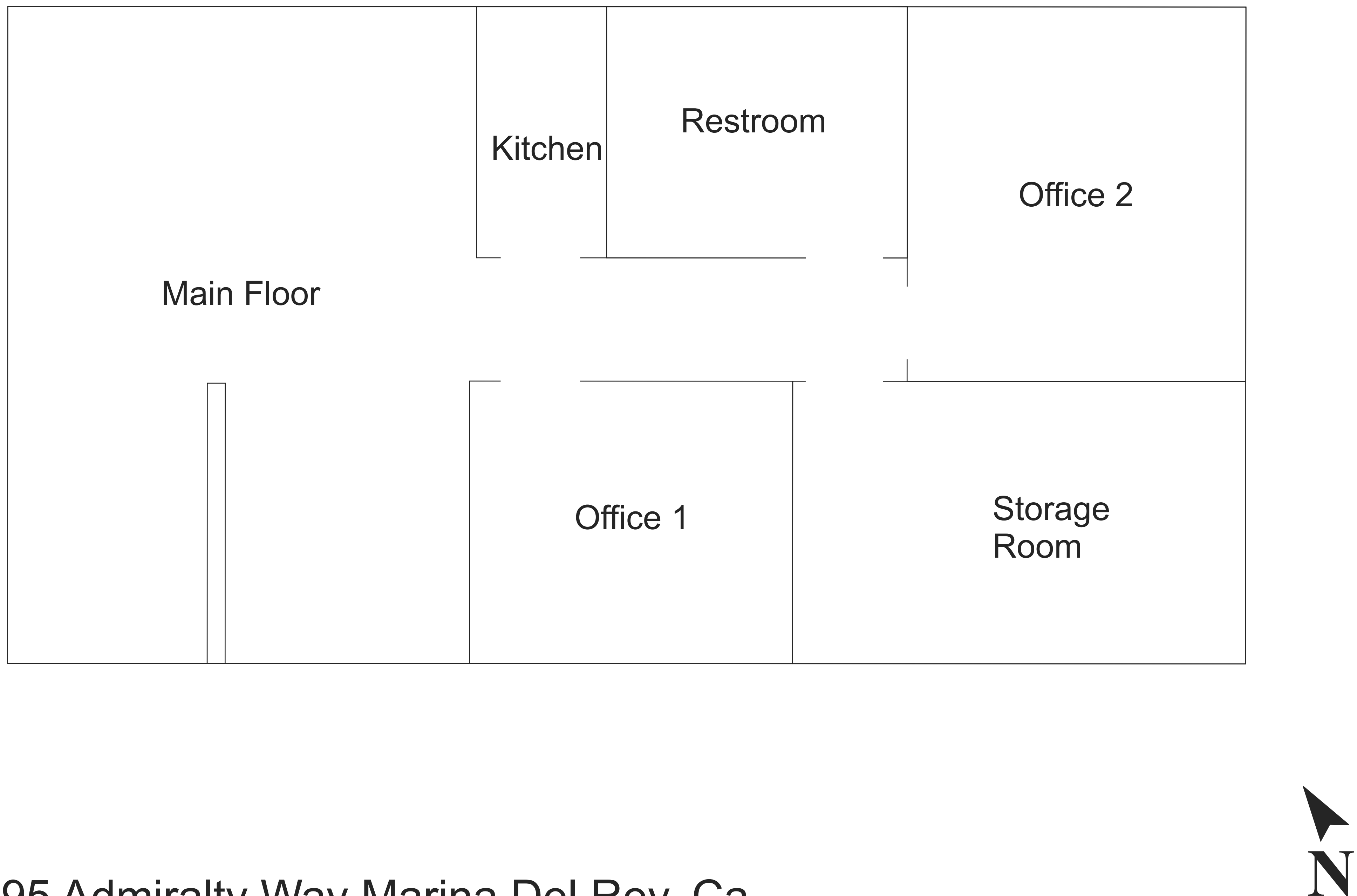
# First Floor



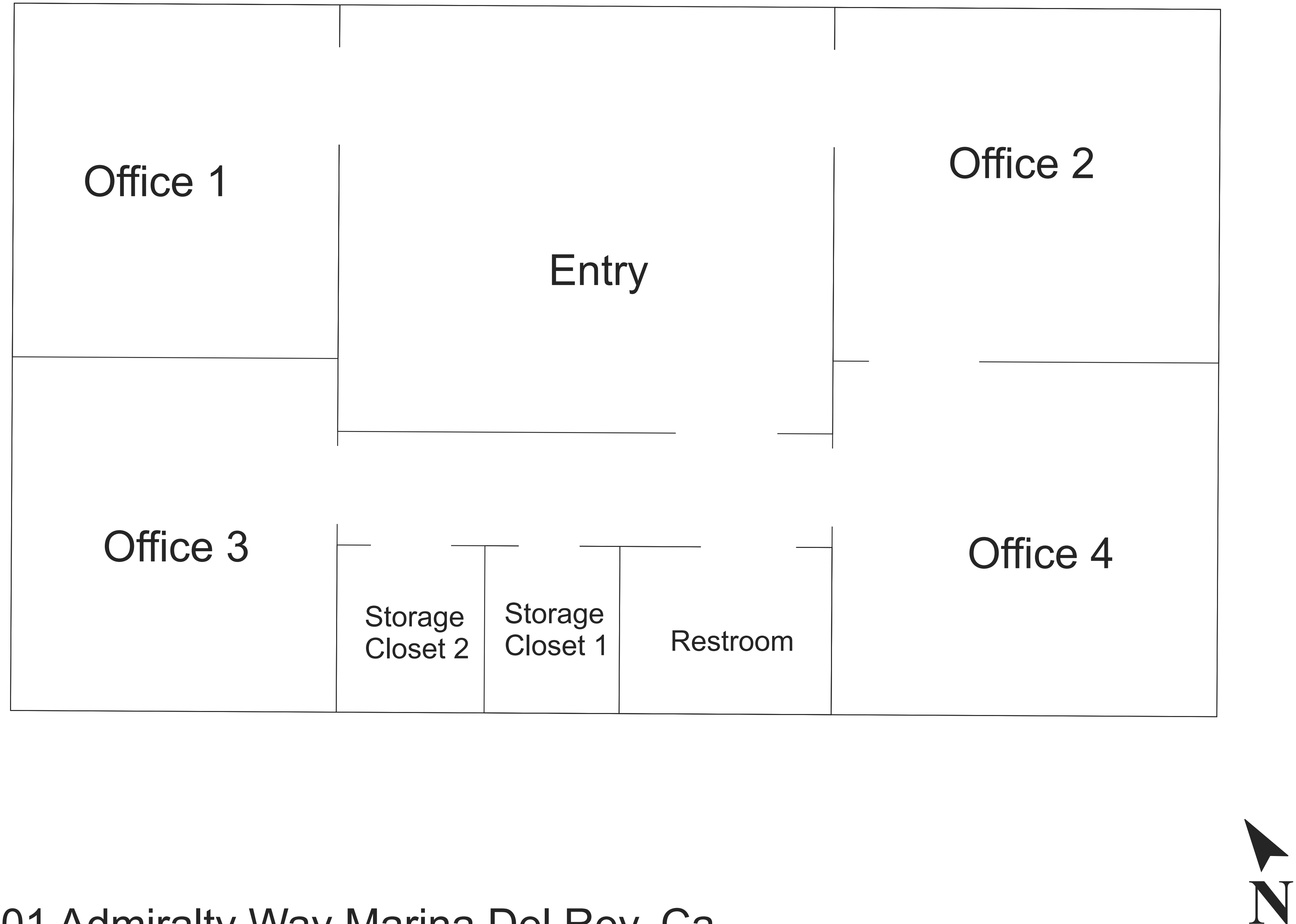

4625-4637 Admiralty Way Marina Del Rey, Ca

# Second Floor

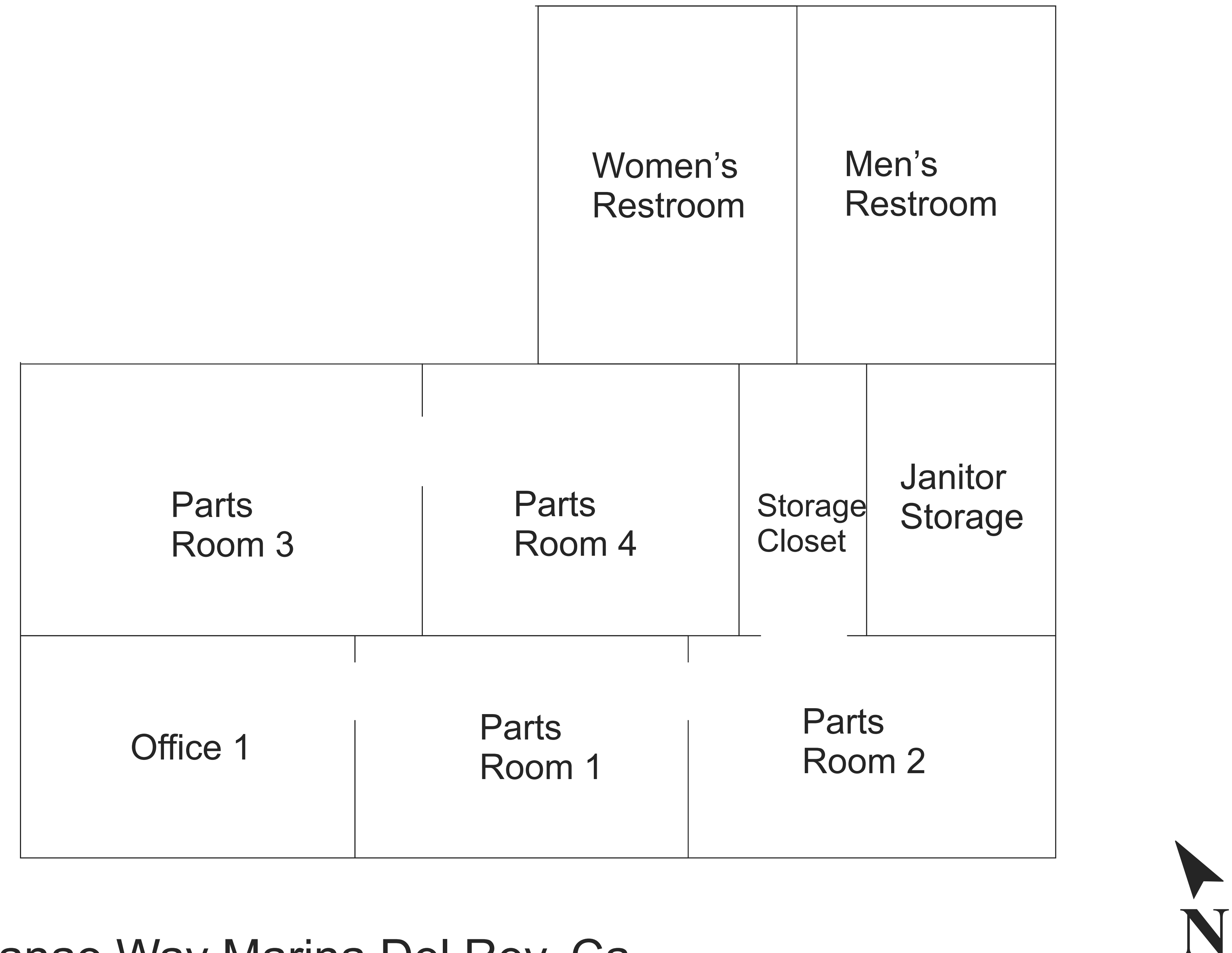

4625-4637 Admiralty Way Marina Del Rey, Ca




4695 Admiralty Way Marina Del Rey, Ca

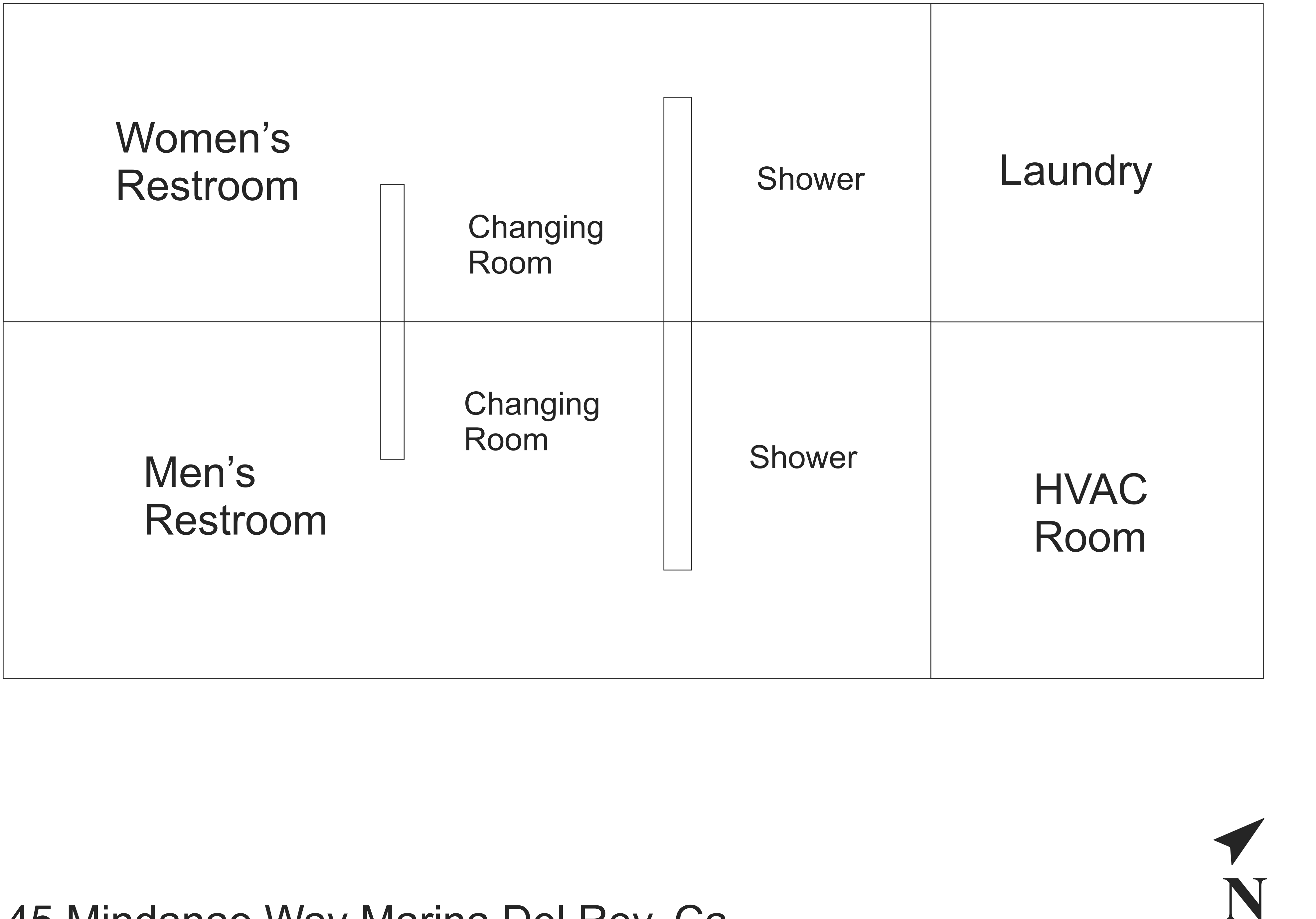



4601 Admiralty Way Marina Del Rey, Ca



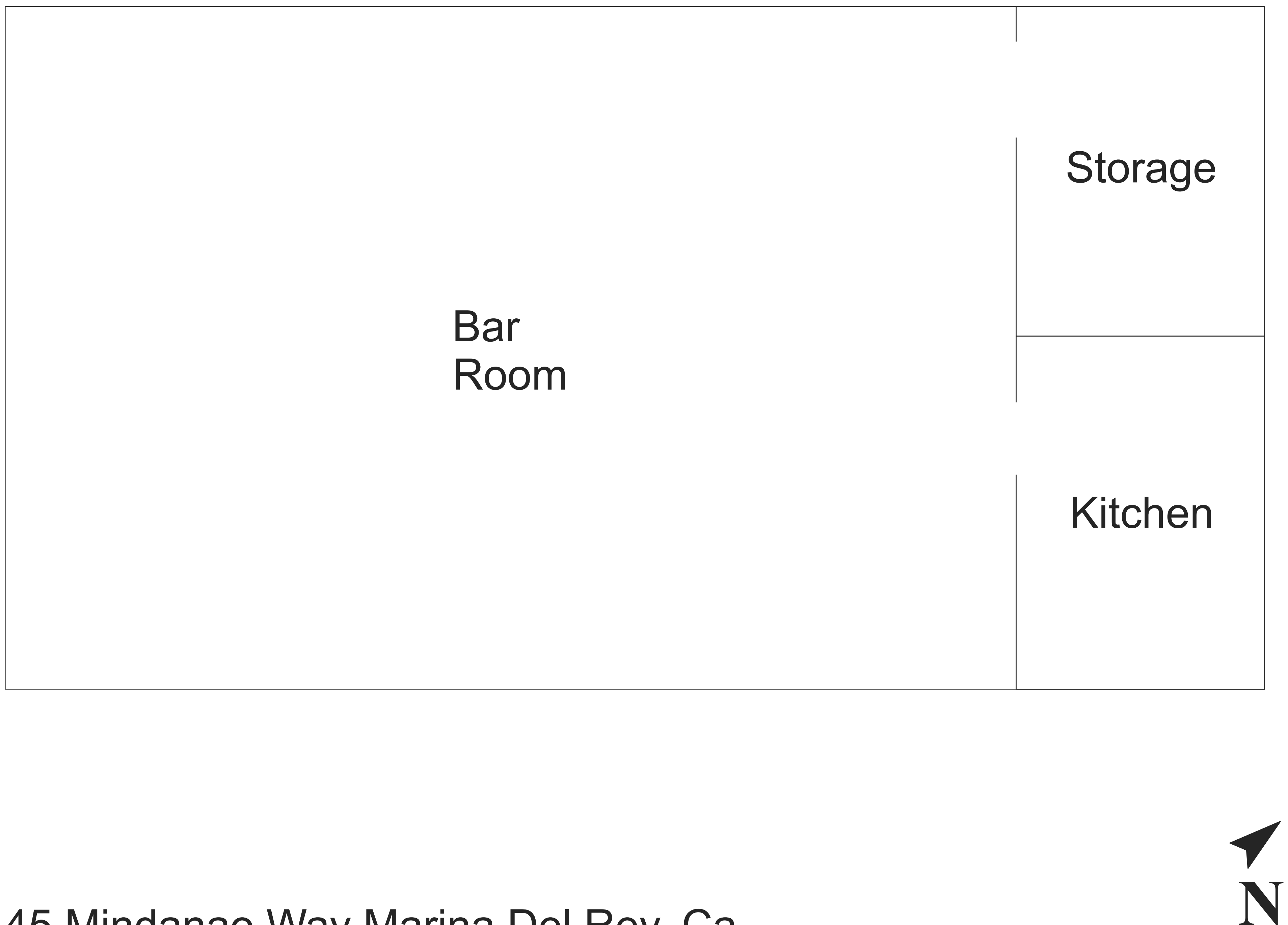

13441 Mindanao Way Marina Del Rey, Ca

# First Floor



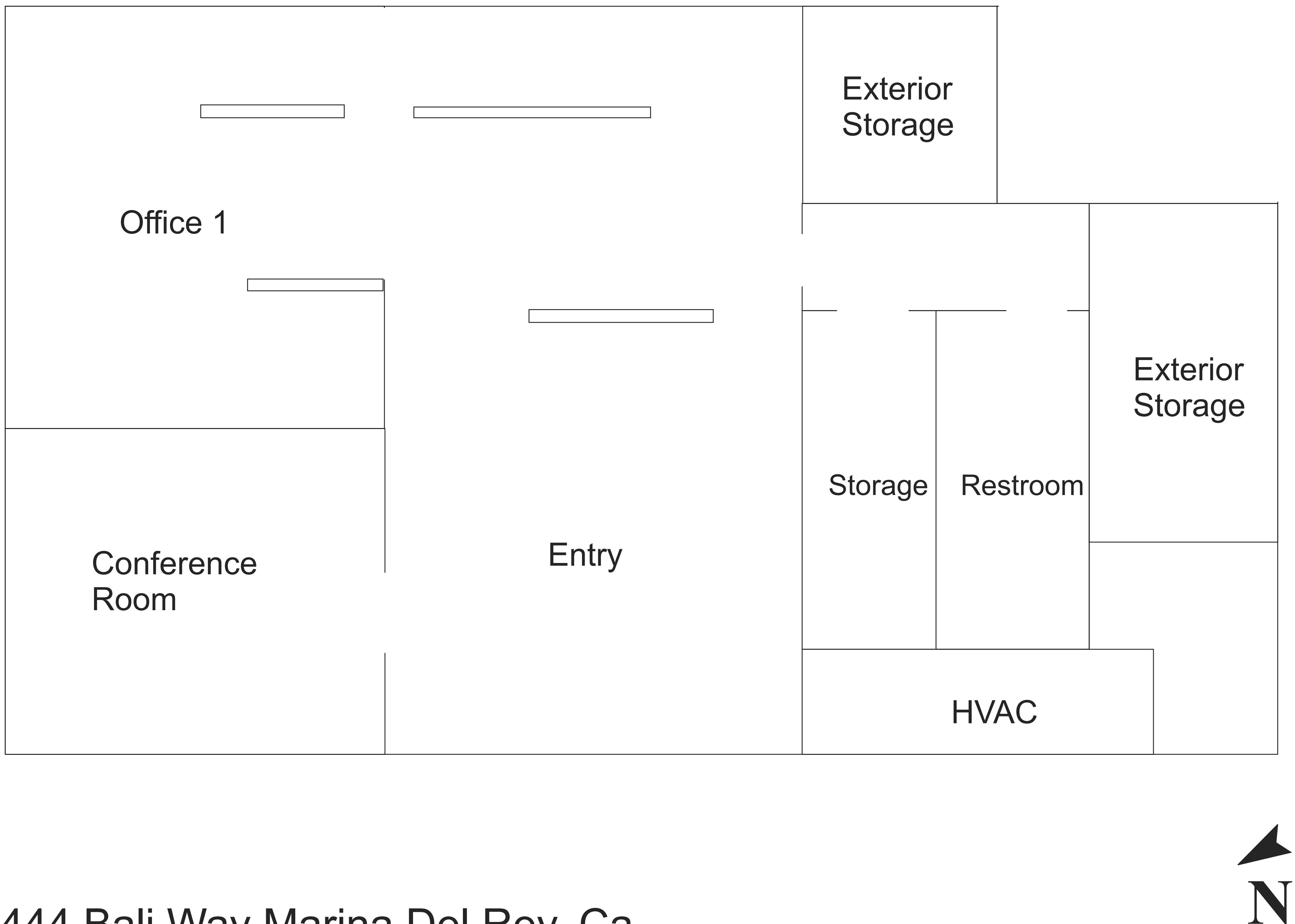

13445 Mindanao Way Marina Del Rey, Ca

# Second Floor



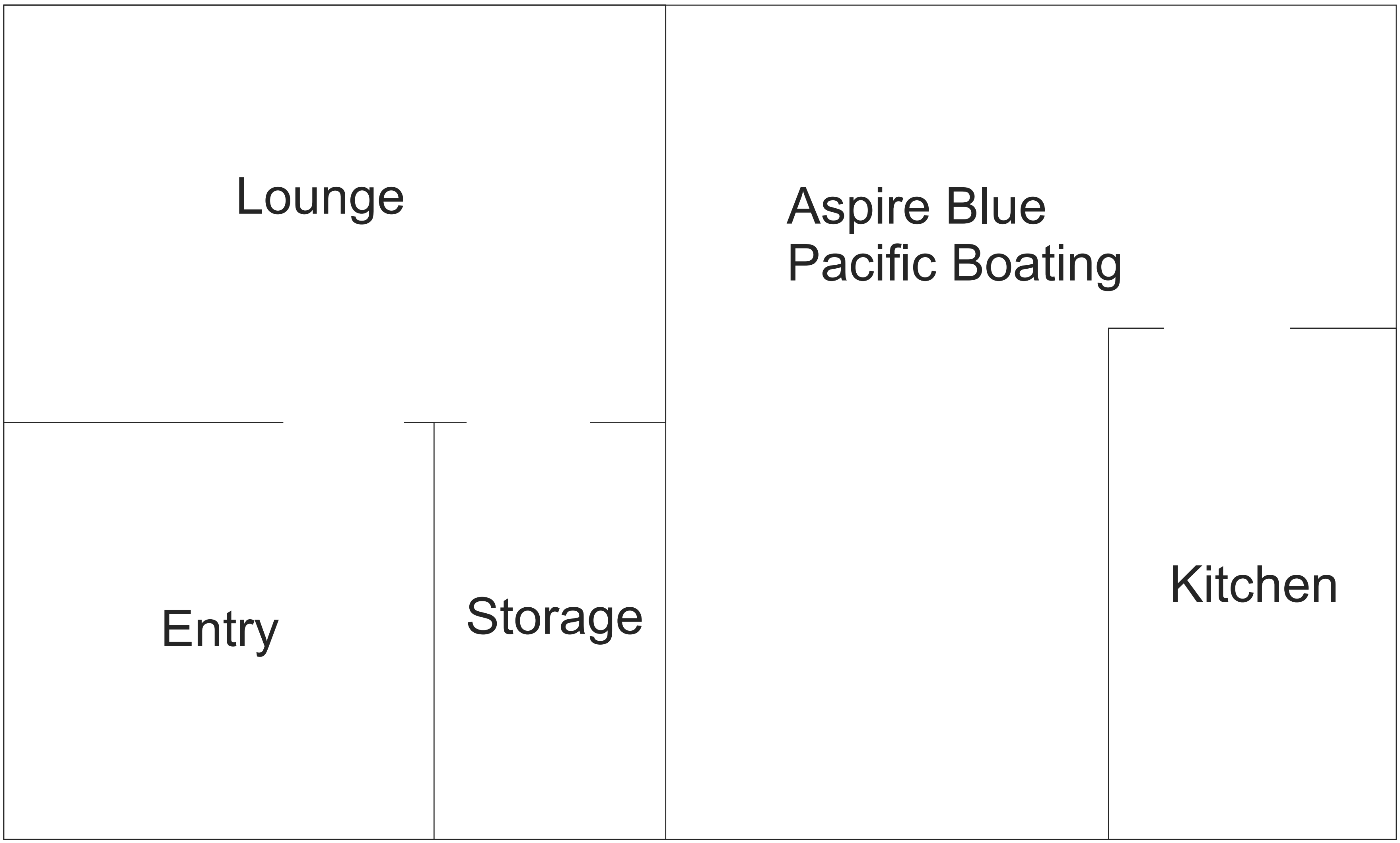

13445 Mindanao Way Marina Del Rey, Ca

# First Floor



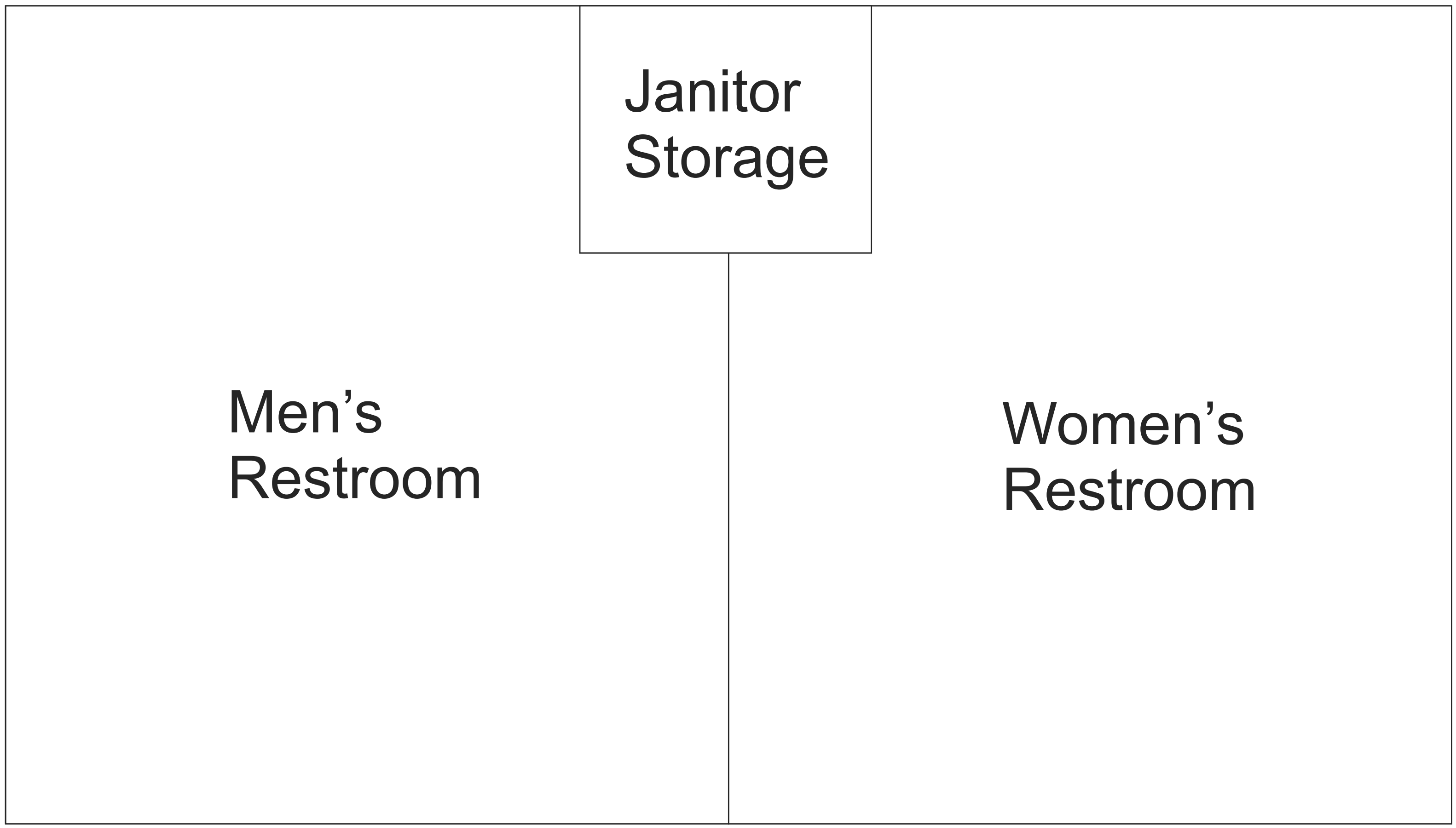

13444 Bali Way Marina Del Rey, Ca

Second Floor




13444 Bali Way Marina Del Rey, Ca

Marina Restrooms





13444 Bali Way Marina Del Rey, Ca